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Does it matter for developing countries that the epicenter of the financial crisis is in the developed world?

Initial steps toward a model of the current financial crisis' effect on developing economies

Abstract

This paper takes initial steps of developing Wim Naudé's discussion paper The Financial Crisis of 2008 and the Developing Countries into a more formalized, applicable model, with the purpose of analyzing whether it has potential of further development. This is done through four steps: 1) identifying relevant scientific theory, 2) defining a model based on Naudé's paper, 3) applying it to a developing country, and 4) redefining the model and discussing remaining criticisms. The model illustrates effects of the financial crisis on developing countries through an interplay between transfer and cushion mechanisms. The model is concluded to be worth developing further, as it potentially can be developed to a formal model. However, there are many potential problems with its applicability, and further studies are necessary.

Keywords: Developing countries, financial crisis

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1. Introduction

When Lehman Brothers went bankrupt in 2008, it initiated a global financial crisis (Gylfason et al. 2010, p. 34). The crisis has had clear negative effects on the developed world, but there are varied opinions on how developing countries will be affected by the crisis. Some researchers say that developing countries will be more adversely affected than developed countries, as they are more vulnerable per se (e.g. Alarcon et al. 2009). Others believe that there are reasons to have a more positive standpoint. For example, Horhota et al. (2009, p. 12) state that developing countries will not show such a significant slowdown since “the centre of the financial crisis is in the US and EU, and this is also where the most substantial economic slowdown will be experienced”.

Naudé brings both of these views into perspective in his discussion paper *The Financial Crisis of 2008 and the Developing Countries* (2009). He states reasons as to why there might be a negative impact of the crisis on developing countries, as well as reasons why many large emerging countries may overcome the crisis in a relatively short period of time, and may even avoid recession.

As Naudé brings up both positive and negative aspects that might affect how developing countries will be affected by the crisis, his paper could potentially be used as a base for understanding how individual developing countries will be affected by the crisis. However, Naudé’s discussion paper is too narrative in its presentation and cannot currently be used for such purposes. In fact, no one has yet developed a formalized model which explains how developing countries might be affected by the crisis. This is where we wish to make a contribution.

We want to take initial steps toward defining a model concerning how developing countries will be affected by a crisis whose epicenter is in the developed world. In doing this, we will develop Naudé’s discussion paper regarding how developing countries will fare in the financial crisis towards a more applicable model which fulfills scientific expectations. We wish to be able to conclude if his theories have potential to be further developed into a formal model.

2. The purpose of this essay

The purpose of this essay is to answer the question: Is Naudé's discussion paper The Financial Crisis of 2008 and the Developing Countries worth being developed further into a more formalized, applicable model to be used when analyzing the effects of the financial crisis on developing countries?

3. Method

To answer the main purpose of this paper, we will take initial steps in developing a model based on Naudé's discussion paper and see if we identify reasons as to why it should not be further developed. After presenting a summary of Naudé's discussion paper, we will proceed in four steps.

Step 1 of developing the model will be to present relevant aspects of scientific theory to identify what the prerequisites of a model are.

In Step 2 we will restructure Naudé's discussion paper into a model in accordance with the principles of scientific theory identified in the previous step. As we wish to test the potential of Naudé's theories, we will initially define the model as closely to his original ideas as possible.

The purpose of Step 3 is to identify what problems are connected to the model. We will here apply the model to a developing country as a method of identifying such problems. We have chosen Thailand, since it has some characteristics that according to Naudé would make it fare better in the crisis, and some characteristics that would have negative effects.¹ This makes Thailand a suitable choice as we will be able to evaluate both positive and negative factors of the model.

In Step 4 we will evaluate and redefine the model based on problems identified in Step 3. We will discuss the criticisms that we have not been able to resolve through redefinition. If criticisms exist that cannot be resolved, we will have found reasons to say that the model is not worth developing further. If no definite criticisms have been identified, we will conclude that the model is worth developing further.

¹ Examples of positive factors are having experienced the Asian crisis and having recent economic growth. Example of a negative factor is that Thailand is a relatively open economy.

4. Delimitations

It is not possible to develop a finalized model within the scope of this paper. We will only take initial steps in developing a model, and use this to get an indication of whether or not it is worth further development.

When applying the model in Step 3 we will look at the years after the Asian crisis until present, if complete data for this period is available. In some of the cases we will look at longer time periods if it adds to our evaluation of a specific factor.

5. Summary of Naudé's theory

In his paper *The Financial Crisis of 2008 and the Developing Countries* (2009), Naudé discusses the impact of the financial crisis on developing countries.² He lists and discusses three transfer mechanisms which he argues can channel the negative effects of the financial crisis. He also states his reasons for thinking that more optimism is warranted in the case of developing countries.

Starting with the transfer mechanisms, the first one Naudé lists is banking failures and reductions in domestic lending. This can be realized both directly and indirectly. Direct transfer could happen in two ways. First, through inter-relationships that a developing country's banks have with international banks. Second, through foreign owned banks with operations in a developing country. There would also be a risk of indirect transfer through declines in stock market prices and housing prices. Such downturns would reduce the capital of banks for example, which in turn would reduce lending in society. This would lead to reduced investment, lower growth and higher unemployment. In a longer perspective, this would lead to lower demand, which would reduce economic growth further.

The second transfer mechanism is reduction in export earnings. Naudé predicted expected reductions in export earnings through a decline in commodity prices, tourism and export demand.

The third transfer mechanism is reduction in financial flows to developing countries. This would happen through reduction in official development assistance (ODA), foreign direct investment (FDI), short-term trade credit and remittances.

² This discussion paper will from this point on be referred to as *Naudé's theory*.

Despite these transfer mechanisms, Naudé calls for a more positive attitude regarding the outcome for developing countries in the current financial crisis due to the following reasons:

- 1) The epicenter of this crisis is in developed countries. It affects developing countries as an exogenous shock, not as a result of inappropriate domestic factors as in the past.
- 2) Developing-country banks have not been as directly affected. Most of these banks were only marginally exposed to the US subprime crisis. As a result, direct impact has been largely avoided.
- 3) Evidence of a measure of decoupling of growth rates in recent years has been presented, for example by Te Velde (2008) and Lin (2008), showing an acceleration of developing countries' GDP growth. Although the financial recession might slow the momentum of this growth, it will not stop it.
- 4) Developing countries are now more resilient. This is a result of good growth, better policies, and having learned lessons during the 1998 Asian crisis.
- 5) All predictions show that China and India will continue to grow.
- 6) Both developed and developing countries have introduced extensive countercyclical fiscal expansion packages.

Due to these six reasons, Naudé states that the financial crisis might not be another great depression for developing countries, and a full-out recession might be reduced in general.

6. Step 1: Scientific theory

In order to develop Naudé's theory into a formalized model, we need to identify what the prerequisites are of a scientific model. Therefore, we will identify key areas of scientific theory concerning models. The implications identified will be further addressed in Step 2 when defining the model.

The definition and aim of models

A model can be defined as a substitute system that is directly examined in order to indirectly acquire information about the system it represents. The reasons for using models are various. For example,

one might use a model since the system it represents is too complex. The aim of a model is to give insight into '*why*' and '*how*' something happens in the real world. (Mäki 2005, p. 304)

On assumptions

As models are used as representatives of systems that are too complex to study directly, they will exclude certain aspects of reality. This can be done through assumptions, or “explicitly formulated idealizations” (Mäki 2009, p. 7). Assumptions exclude excess factors and simplify the setting of the model, so that the issue of interest can be studied in isolation (Mäki 1992).

As models are simplifications of reality, their assumptions are not necessarily true. Friedman (1953, p. 14) argued that as long as the model makes useful predictions, the accuracy of the assumptions is of no importance. Musgrave (1981, p. 379) argued that Friedman’s view on assumptions reduces the model to a tool, which only relevant use is its predictions. As one of the defined aims of a model is to be able to answer the question of *how* a process works, Friedman’s view is fruitless.

Mäki (2009, p. 5) argued that false assumptions are no obstacle to a model being true *per se*. Instead, he argued in accordance with Musgrave (1981) that different assumptions can play different roles in economic models. The Musgrave-Mäki typology (as defined by Hindriks 2006, p 402-423) differentiates between first-order and second-order assumptions.

First-order assumptions are the main idealizations made. They have direct impact on the model. Falsity of first-order assumptions is often unproblematic. The second-order assumptions define the reasons why the first order assumptions were made. The truth of these assumptions is important as they increase our understanding of why we rely on first-order assumptions, even if the first-order assumptions are false. There are three types of second-order assumptions in the Musgrave-Mäki typology that we find relevant for the development of our model: applicability assumptions, tractability assumptions and negligibility assumptions.

An applicability assumption states that

Theory *T* only applies to domains of which first-order assumption *A* is (approximately) true.

It defines which conditions are necessary for using the model to be applicable.

A tractability assumption states that

First order assumption $\mathcal{A}$ makes the problem under investigation (more) tractable.

Assumptions that make the issue to be studied more easily managed and controlled reduce the complexity of the problem while still enabling study of the main processes.

A negligibility assumption states that

The factor F mentioned in first-order assumption $\mathcal{A}$ has a negligible effect on the phenomenon under investigation relative to the purpose for which the theory is used.

It defines factors as having no or negligible effect on the studied issue, meaning that such factors can be excluded from the model. This idealization is an effective way to reduce the studied aspects and achieve isolation. Assumptions defined for the model to be developed will be based on the Musgrave-Mäki typology.

On testability

Even though models violate the truth by definition, they are expected to yield true information about real features, and represent true dependencies and mechanisms in their target domains (Mäki 2009, p. 2). If a model is to be accepted as delivering true information on the process or outcome of what it studies, it needs to be possible to test the conclusions of the model. Logical positivism is a branch of scientific theory that discusses just that.

The key point made by logical positivists is that “proposition is meaningless unless it is capable of empirical verification” (Hardie 1938, p. 214). For social sciences, this involves making it possible to decide whether symbol-patterns of the model actually fit reality (Blumberg & Feigl 1931, p. 288-289). One critic of verification was Popper (1968), who argued that verification is too strong a criterion as it in reality is impossible. He proposed that verifiability should be replaced by a criterion of falsifiability. If a model provides an accurate conclusion, then no reasons have been found to discard it and the *possibility* of it being true is still present. But if a model provides a false conclusion, then it is definitely discarded. To enable falsification of the model we will develop in this paper, the model will have to state what cannot occur if it is true.

On simplicity

Another guiding criterion in developing a model is the Ockham's razor. It states that "entities are not to be multiplied beyond necessity" (Encyclopædia Britannica 1990). This means that if we have the possibility of defining a model in two ways, which both have the same explanatory value, the simpler version is always preferred. Popper (1968, p. 140-142) connects this to his argument of falsifiability by arguing that simpler theories are preferred to more complex ones since they are easier to test. For us, this means that the model to be developed should be as simple as possible without compromising its explanatory value.

7. Step 2: Restructuring Naudé's theory into a model

The second step toward developing a model based on Naudé's theory is to redefine his theory in accordance with the principles identified in the previous section. In this step, we will keep the definition of the model as close to Naudé's theory as possible as we want to apply his theories on an actual case to critically review his theory and to identify what further revisions are necessary.

7.1 Defining the purpose of the model

The purpose of the model will, in accordance with the aim of models as defined in Step 1, be to:

Explain how developing countries will be affected by an exogenous crisis.

Our aim is that the model should be applicable to any given developing country for any given financial crisis in the developed world. This will however not be achieved within this paper, as our main purpose now is to identify whether Naudé's theory is worth being further developed into such a model.

7.2 Identifying the assumptions of the model

Identifying what assumptions are implicitly made by Naudé is necessary in order to formalize his theory. We have identified three first-order assumptions of Naudé's theory.

One first-order assumption implicitly made by Naudé is:

(A1) Countries of the world can be divided into two groups: developed countries and developing countries. These groups have defining differences, but countries within each group are not homogenous.

A fundamental part of this assumption is that these groups have defining differences, but that countries within each group are not homogenous.³ If they were homogenous, there would be no possibility of different outcomes for different countries. The second-order assumption of (A1) is a tractability assumption, since making assumption (A1) simplifies the relationships between countries and makes studying the financial crisis effect on developing countries more manageable. The second-order assumption can thus be defined as:

(A2) First-order assumption A1 makes the problem under investigation more tractable.

The second first-order assumption identified is:

(B1) The studied crisis is an exogenous shock for developing countries.

(B2) is an explicit statement made by Naudé (p. 9), but he does not define it as an assumption. In the context of developing a model based on Naudé's theory, it is needed as an assumption as the model will not be applicable if a crisis is endogenous. This makes the second-order assumption an applicability assumption:

(B2) The model only applies to domains of which first-order assumption B1 is (approximately) true.

The third first-order assumption implicitly made by Naudé is:

(C1) Other factors than the crisis are absent or has no effect on the studied developing country's growth

³ We will use UN Statistical Division's (2010) definition of developing and developed regions as classification for which countries are seen as developed, and which are seen as developing.

(C1) is an implicit idealization made by Naudé, as he does not bring up any other factors into his discussion regarding the outcome of developing countries economic growth. This excludes issues that might make the financial crisis effects on developing countries too complex to study. Therefore, the second-order assumption connected to (C1) is a negligibility assumption:

- (C2) Other factors than the crisis has negligible effects on the phenomenon under investigation relative to the purpose for which the theory is used.

The validity of the second-order assumptions is important in determining whether Naudé's theory is worth developing into a more formalized model. If (A2) is false, it will be impossible to use the model due to complexity. If (B2) is false, the whole set-up of the model is irrelevant. If (C2) is false, the conclusions drawn from the model when applying it on a case will not be valid. Therefore, after the application of the model we will evaluate the validity of the second-order assumptions to determine whether any of these result in problematic outcomes and needs to be changed or disregarded.

7.3 Defining the parameters of the model

The next step is to organize Naudé's theory into different parameters which explain the effects of the crisis on developing countries. As we wish to keep the model as close to Naudé's theory as possible, we will only make semantic changes, keeping the fundamental aspects of his theory intact. However, factors that describe the same phenomenon will be reduced in accordance with Ockham's razor.

We have divided the model into two main parts: *transfer mechanisms* and what we have chosen to call *cushion mechanisms*. The transfer mechanisms represent the possible channels through which the negative effects of the crisis might be transferred. The cushion mechanisms will represent the possible factors which can make developing countries more resilient to the effects of the transfer mechanisms.

Transfer mechanisms

Starting with the transfer mechanisms, Naudé mentions three types as previously discussed in section 5; *banking failures*, *reduction in export earnings* and *reduction in financial flows*. He also defines how these mechanisms will transfer the effects of the crisis through identifying relevant sub mechanisms. For clarification purposes, we choose to call these *factors*. Naudé does not explicitly name any classifications regarding their strength even if it is implied that it can vary. Therefore, we will define a

simple classification. The transfer mechanisms can through the factors be said to take the form of three dimensions: strong, weak, or not present. Given that there are no cushion mechanisms, if transfer mechanisms are strong they will transfer negative effects from the developed world to the developing country resulting in lower GDP growth. If they are weak, there might be a transfer, but not as significant. If they are not present, no negative effects will be transferred through them.

The first transfer mechanism, banking failures, is divided into two factors: *direct* and *indirect banking failures*. These are in turn divided into sub factors. Direct banking failures is divided into *inter-relationships with international banks* and *foreign owned banks*. The factor indirect banking failures is divided into *stock market* and *house market*. The second transfer mechanism, reduction in export earnings, is divided into three factors: *commodity prices*, *tourism* and *export demand*. The third transfer mechanism, reduction in financial flows, is divided into four factors: *ODA*, *FDI*, *short-term trade credits* and *remittances*.

Cushion mechanisms

Cushion mechanisms will also be said to take the form of strong, weak and not present. However, as their function is to reduce the effects of transfer mechanism, they are only of interest if at least one transfer mechanism has potential of negative impact on a country. If the cushion mechanisms are strong, they will reduce the effects of the transfer mechanism. If they are weak, the outcome is not so clear. If they are not present, there are no obstacles for transfer mechanisms to have a negative effect on the economy.

Naudé states that, decoupling of growth rates, previous growth period, better policies, having learned lessons from the Asian crisis, countercyclical fiscal packages, the fact that India and China will continue to grow and that developing country banks have not been as directly affected are issues with potential of making developing countries more resilient against negative effects of transfer mechanisms.⁴ Those out of these issues which are not directly captured by transfer mechanisms have been redefined into three cushion mechanisms: *economic growth*, *better policies* and *countercyclical packages*.⁵

⁴ When listing his reasons as to why developing countries might avoid recession, he also mentions that the epicenter of the crisis is in the developed world. This fact will be used later in the definition of the model (see p. 11).

⁵ Two of these issues are already captured by the transfer mechanisms, and are therefore excluded as cushion mechanisms. If Naudé's argument about the effects on banks is true, positive effects will be captured by a weak or non present factor in the equivalent transfer mechanism. If India and China will keep on growing, this will be captured by a smaller impact on export demand. In accordance with Ockham's razor, we therefore exclude these topics as explicit parameters of the model.

The first cushion mechanism is divided into two factors: *previous growth period* and *decoupling of growth rates*. This is a suitable division, as they are both concerned with previous economic growth for developing countries. In the second cushion mechanism, better policies, we have incorporated two of Naudé's issues; better policies and lessons learned from the Asian crisis. The reason for this is that lessons learned during the Asian crisis will be incorporated in new policies in countries which experienced that crisis. This reduction is in line with Ockham's razor. The third cushion mechanism, countercyclical packages, is kept as defined by Naudé.

A summary of the transfer and cushion mechanisms and their factors is illustrated in Figure 1, Appendix A.

Predictions of the model

Now that we have defined the parameters of the model in accordance to Naudé's theory, we look at what the model should predict.

As the purpose of the model is to explain how developing countries will be affected by an exogenous crisis, one can say that the model will provide an answer to the question:

Does it matter for a developing country C that the epicenter of the financial crisis is in the developed world?

The model would be used to answer this question in the following way: If transfer mechanisms are stronger than cushion mechanisms, there will be a decline in GDP growth rate for a developing country and it will therefore not matter that the epicenter of the crisis is in the developed world. However, if the transfer mechanisms would not be present or if the cushion mechanisms would be stronger than the transfer mechanisms, the GDP growth rate will not be negatively affected by the crisis. Therefore, it would matter for the developing country that the epicenter of the financial crisis is in the developed world in the sense that it would be relatively unaffected by the crisis.

Defining this as a prediction of the model might be seen as going somewhat against Naudé, since he argued that developing countries will be less adversely affected by the crisis due to the fact that the epicenter is in the developed world. However, if this argument of his is true, then the model will confirm it by predicting that there will be no significant effects of the crisis on the studied developing country.

Testability of the model

Having defined what the model should predict, we need to identify a falsification criterion for the model in accordance with scientific criteria. This means defining what cannot happen if this model is true.

As the model allows for different outcomes for different developing countries falsification of the model is possible based on its predictions. A false prediction will falsify the model. As the answer to the question regarding whether the epicenter of the crisis matters for a developing country is directly derived from predicting the direction of a developing country's GDP growth rate, the prediction of GDP growth can be used in the following falsification criterion:

If a prediction regarding the growth of a developing country is false, e.g. indicates the wrong direction of a developing country's GDP growth rate, the model is falsified.

In other words, if our model will not lead to the right conclusion regarding the effects of the financial crisis on developing countries, the model will be falsified.⁶

A simplified visualization of the model as defined in this step can be seen in Figure 2, Appendix A.

8. Step 3: Applying the model - The case of Thailand

Now that we have restructured Naudé's theory into a model, we want to apply it to Thailand in order to evaluate the model.⁷ Our focus will be on identifying problems with the model as it was defined in Step 2. As we want to determine whether Naudé's theory is worth developing into a formalized model, we need to first identify its weaknesses to see if these can be overcome by redefining the model, or if they cannot be resolved. This will be done in Step 4.

When applying the model, we will first present data according to the model and draw an initial conclusion on that dimension of the model. Secondly, we will identify problems encountered with such an analysis. We will focus on problems that are connected to the definition or use of the model,

⁶ As we will only take initial steps in developing this model in order to conclude whether Naudé's theory is worth developing further, we will not focus on falsification of the model. At this stage in the development, it is sufficient to define that falsification is possible.

⁷ As the purpose of applying the model to Thailand is to evaluate the model, the focus lies on the evaluation of the mechanisms and not on predicting the outcome for Thailand. As we will only take initial steps in defining the model, we do not aspire to do a thorough application and analysis in this step. To achieve the purpose of this paper, we only need to identify main problems and determine whether they can be solved or not.

which indicates that the model will either have to be redefined or should not be developed furthered. As some of the problems will be reoccurring for many factors, we will not give full comments on each of the factor, but only make further comments when the use of another factor gives a further dimension to the specific problem.

8.1 Transfer mechanisms

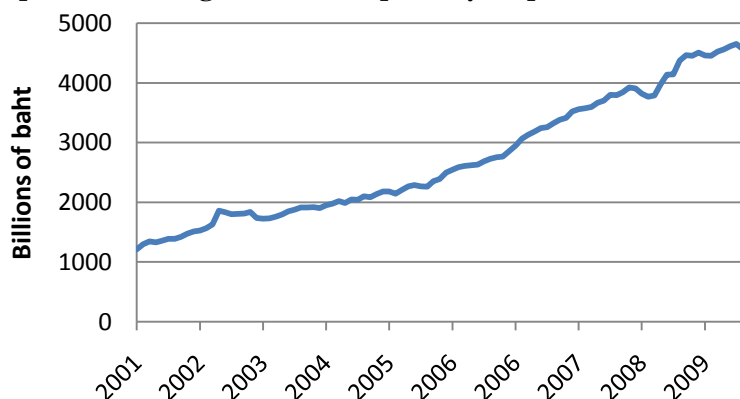
8.1.1 Banking failures

8.1.1.1 Direct banking failures

Inter-relationships with international banks

Naudé does not state any specific data criterion for how to analyze inter-relationships with international banks. We will use net foreign assets of depository corporations as a measurement of how interrelated domestic and foreign owned banks are. If depository corporations have large positive net foreign assets, it is a sign that they are dependent on foreign assets. That would make them more sensitive to a non-domestic crisis.

Graph 1: Net foreign assets of depository corporations in Thailand, Dec 2001-Dec 2009



Source: IMF, 2010

As Graph 1 indicates, net foreign assets have been rising steadily during the last decade. This indicates that Thailand's financial institutions have become increasingly sensitive to changes in the global financial market. This implies that this sub factor may have a strong impact on the Thai financial banking system during an international financial crisis.

Problems encountered with this sub factor

- Problem of importance

To be able to determine if this is an important sub factor or not, the model overlooks the necessity of determining the importance of foreign assets for Thailand's economy. If net foreign assets are only a fraction of e.g. Thailand's GDP, it would not have a great impact on the economy as a whole and it would be irrelevant if it had increased or not.

- Problem of no defined choice of data

A second problem is the lack of definition regarding which data to use. As this is not specified by the model it undermines the objectivity when using it. As you might draw different conclusions regarding what data you choose to look at, this is something that needs to be addressed.

- Problem of no objective decision criteria

Another criticism is that we lack an objective decision criterion for the factor. The model as is defined gives no practical guidance in what data would indicate a strong, weak or not present factor. The lack of decision criteria leaves room for subjectivity when drawing conclusions and thus undermines their validity. This is highly relevant criticism regarding the definition of the model, and applies to all mechanisms and factors of this model.

Foreign owned banks

Moving on to foreign owned banks, there are still different possibilities as to what data can be used for analysis. We will look at the percentage worth of foreign owned banks' assets compared to the whole financial market. We do this to get an indication on whether or not foreign owned banks play a substantial role in Thailand's financial market. If that is the case, Thailand is more exposed to the risk of international uncertainties.

Based on figures from the Bank of Thailand, foreign owned banks constituted about 18.6 percent of the total banking assets in Thailand in the beginning of 2010 (Bank of Thailand 2010a). The IMF (2009, p. 16) has concluded that they play "an important but limited role" in the Thai financial sector. This indicates that this sub factor seems to have potential of having an impact on Thai financial markets, although it does not seem strong.

Problems encountered with this sub factor

- Problem of factor definition

There is a problem with the weak definition of the sub factor in relation to the purpose of the model. Looking at total assets of all foreign owned banks as we have might lead to false conclusions. This is because some of the foreign owned banks of a country might be owned by developing countries. This problem of weak definition regarding this sub factor needs to be addressed in the model.

- Problem of only looking at the sub factors of direct banking failures

Another problem of the model is of only looking at the sub factors of the transfer mechanism instead of looking directly at banking failures. By looking at how inter-related domestic banks are with international banks and at the presence of foreign owned banks, we can only estimate the risk of banking failures but we fail to see how strong the actual effects of the transfer mechanism has been.

- Problem of no defined choice of data

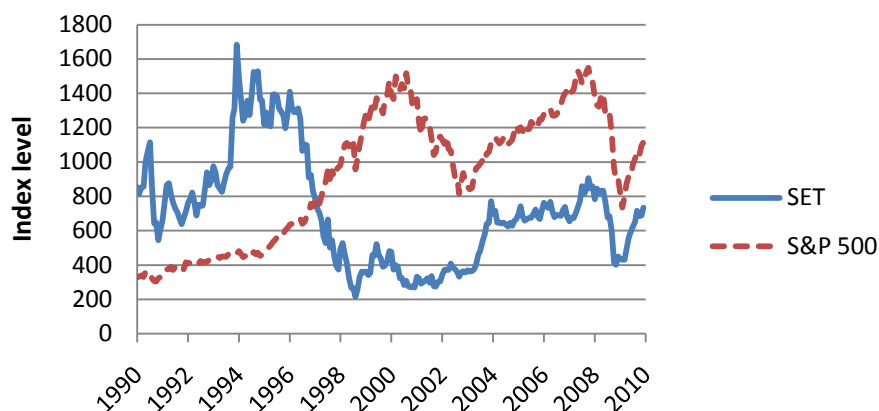
- Problem of no objective decision criteria

8.1.1.2 Indirect banking failures

Stock market

The first sub factor of indirect banking failures is the stock market. Naudé states that it might go down in developing countries due to the drop in stock markets in the developed world. To get an indication on whether or not the Stock Exchange of Thailand (SET) correlates with stock market at the epicenter of the crisis, we will compare the SET to the S&P 500 index. The closer these two indices correlate, all other things being equal, the more adversely affected the SET will be in connection to a negative downturn in the American stock market.

Graph 2: The Stock Exchange of Thailand and S&P 500 index levels, Jan 1990-Dec 2009



Source: The Stock Exchange of Thailand, 2010 (SET) and the Wharton School of the University of Pennsylvania, 2010 (S&P 500)

As we can see in Graph 2, the performance of the SET followed a similar pattern as the S&P 500 index during the years 2005-2009, and in May 2008 both indices started to decline rapidly with a notably sharp drop in September 2008. We can see in the graph that S&P 500 as well as SET recovered relatively quickly and started to increase in the second quarter of 2009, reaching almost the same levels as in the beginning of 2007 by the end of 2009. As the stock performances have largely been moving in similar directions for at least the last five years and since there was a sharp decline in both indices in 2008, the stock market seems to be a strong sub factor.

Problems encountered with this sub factor

- Problem of having no defined timeframe

One critique on the conclusion above is concerned with what timeframe should be taken into consideration. The conclusion drawn above depends on what time span you look at. In Graph 2, we have purposely included data from 1990, as the patterns are different before and after 2003. Before 2003 there seems to be no positive correlation. During the Asian crisis the indices moved in opposite directions. During the IT-crisis in 2000, which originated in the developed world, S&P 500 shows a downturn while SET shows no real changes. The problem with the conclusion above is thus: If there were clearly different patterns less than a decade ago, how much does the present pattern explain about future correlations?

- Problem of assumption (C2)

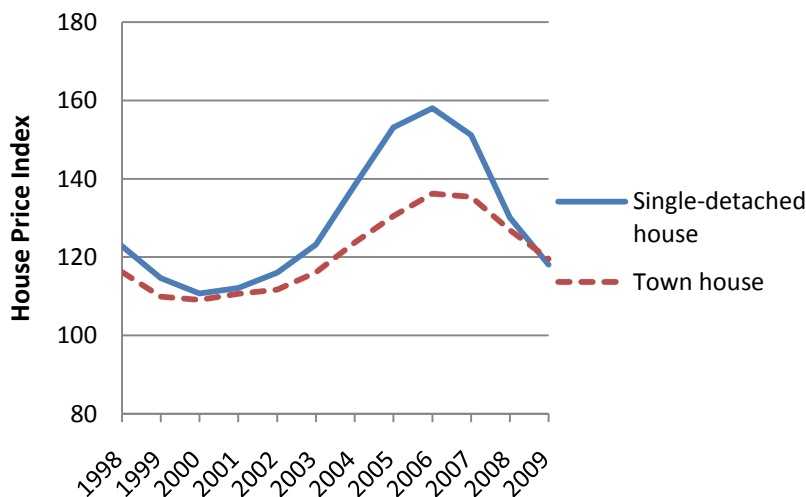
Another critique is concerned with the validity of assumption (C2) of the model. It states that other factors than the financial crisis has negligible effects on the developing countries relative to the purpose for which the theory is used. This implies that other factors cannot have a significant effect on the SET. However, this is not true. For example, the sharpest drop in the SET was in the end of 2008, as a combined result of the shock from the global financial crisis as well as the political crisis that led to the closure of Bangkok's two main airports (Sander et al. 2009, p. 11). This points out that there are other factors that have an impact on the SET. This means that assumption (C2) is false, which needs to be addressed.

- Problem of no objective decision criteria

House market

Next, we will look at whether or not the house market has been affected negatively by the crisis. We will look at property prices in Thailand before and during the years of the crisis.

Graph 3: Thailand house price index (1991=100), 1998-2009



Source: Bank of Thailand, 2010b

As we can see in Graph 3, residential property prices started to decline around 2007 after having continuously increased since the beginning of the millennium. The sharp downturn in 2008 and 2009 implies that the financial crisis has had a negative effect on the Thai house market, and thus adds to the strength of the transfer mechanism.

Problems encountered with this sub factor

- Problem of assumption (C2)

The assumption that other factors have a negligible effect on the house market is not true. The political uncertainty also has an effect on housing prices, as is made clear by the following quote:

Political turmoil has made Thailand significantly less attractive to buyers, especially to foreign buyers. CBRE reported that foreign demand for residential properties had dropped by up to 90% by June 2009. Real house prices in Thailand were 34.2% below their 1992 peak, as of Q2 2009. (Global Property Guide 2009)

Swedish buyers have been reported avoiding the Thai house market due to the current political protests (Sundén 2010). Domestic factors thus affect housing prices by reducing foreigners demand.

Further, national legislation of Thailand might make the house market less exposed to international effects. As a foreigner, you can only own 49% of a house (Condominium Act 1999, Section 4). This can potentially reduce effects of this transfer mechanism. Even though this law can be seen as having cushioning effects due to its inhibiting effects on this sub factor, other laws might have reversed effects. This furthers the problems with assumption (C2).

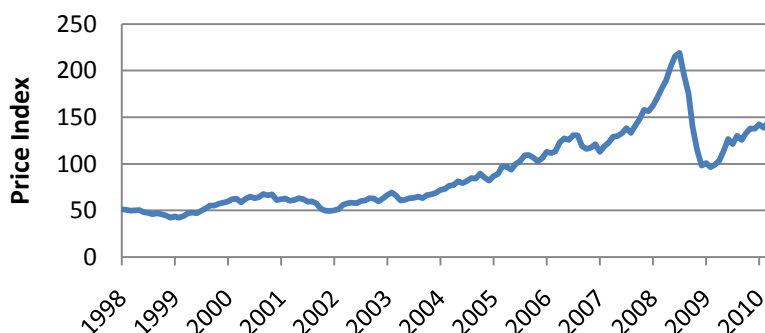
- Problem of no objective decision criteria

8.1.2 Reduction in export earnings

8.1.2.1 Commodity prices

The first factor of reduction in export earnings is commodity prices. When looking at commodity prices, we want to see if there is a decline in prices as an effect of the financial crisis, as this would negatively affect Thailand through reductions in export earnings.

Graph 4: Commodity price index (2005=100), Jan 1998-April 2010



Source: IMF, 2010

Graph 4 shows that after a sharp rise in commodity prices during 2007 there was a sharp decline in the third quarter of 2008. The commodity value started to increase again in the second quarter of 2009. The decline is correlated with the financial crisis, indicating strong transfer effects of this factor.

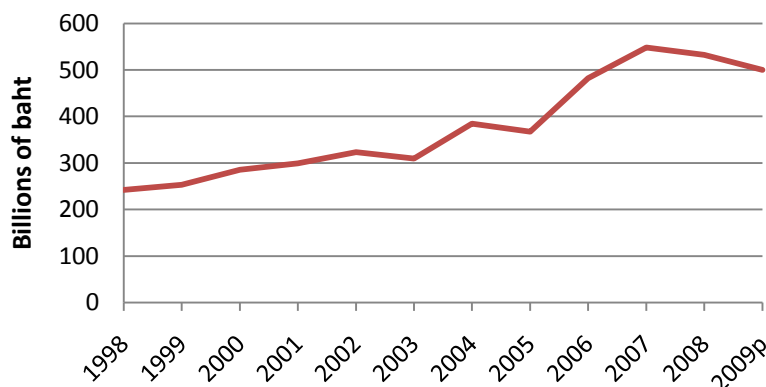
Problems encountered with this factor

- Problem of importance
- Problem of no objective decision criteria

8.1.2.2 Tourism

Next, we will look at tourism revenue to see whether tourism has been affected by the crisis or not. If there is a decline in tourism revenue during the years of the financial crisis, then this factor has a negative effect on Thailand's economy.

Graph 5: Thailand's tourism revenue from international visitors, 1998-2009



Source: Tourism Authority of Thailand, 2008 (Data for years 2008-2009 in *The Nation*, 2009)

In Graph 5 we can see that Thailand's tourism revenue increased 2006 and 2007 but decreased in 2008. Predicted values for 2009 point towards a further decline in tourism revenue. It implicates that tourism transfers some of the effects of the financial crisis to Thailand.

Problems encountered with this factor

- Problem of factor definition

There is a problem with the definition of the factor that inhibits isolation of the financial crisis effect on tourism. Since we have looked at tourism from all countries, we do not know if the reductions are

an effect of the crisis or not. If reduction in tourism earnings can be derived from countries unaffected by the crisis, it is not a relevant factor of a transfer mechanism. This needs to be addressed in the definition of the model.

- Problem of assumption (C2)

The next criticism is connected to the falsity of assumption (C2). In Graph 5, we see two earlier drops in tourism, most likely due to the SARS epidemic (2003) and the tsunami (December 2004). Also in 2008, there was a domestic event that according to the Bertelsmann Stiftung (2009, p. 22) significantly reduced tourism revenue for Thailand:

The PAD' blockade of Thailand's two principal international airports in December 2008 was estimated to have caused economic damage of over 140 billion baht. The result was a crippling of the nation's tourism industry, and prompted economic institutions to further revise economic growth projections downward to just 2% for 2009.

The "yellow shirts" blockade of Thailand's two principal international airports in December 2008 thus seems to have negatively affected tourism revenue. In addition, the swine flu in 2009 as well as the current protests by the "red shirts" that is taking place in Bangkok at the time of writing is likely to have a negative effect on current tourism revenue for Thailand (Pettersson 2010). As a result, we cannot draw a clear conclusion about how strong tourism is as a factor, since we cannot ensure that the reduction is due to the financial crisis.

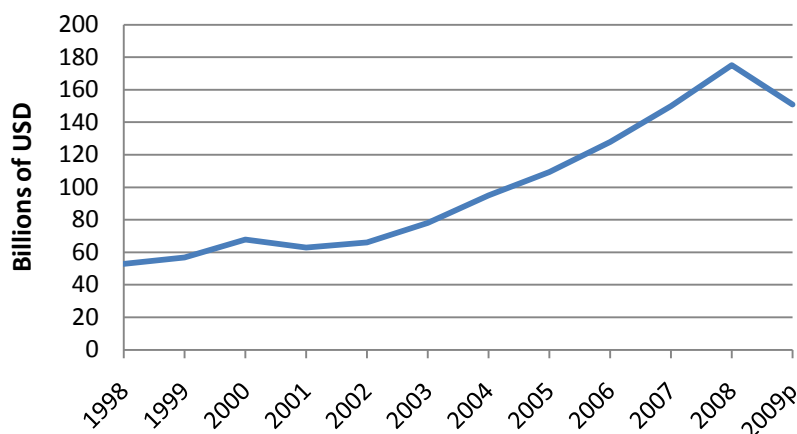
- Problem of no objective decision criteria

- Problem of importance

8.1.2.3 Export demand

Looking at export demand, we want to investigate whether the downturn in the developed world has affected Thailand through reduction in total export earnings. If we would see a decline in Thailand's export earnings during the years of the financial crisis compared to the previous years, we can assume that there is a weaker external demand and that Thailand is affected by this transfer mechanism.

Graph 6: Thailand's total export earnings, 1998-2009



Source: Bank of Thailand, 2010c

As we can see in Graph 6, Thailand's export earnings continuously increased 2002-2008, but decreased in 2009 according to preliminary figures. As there seems to have been a weak external demand in 2009 for Thailand's exports, this seems like a strong factor.

Problems encountered with this factor

- Problem of factor definition

One problem is that we cannot know based on how the factor is defined whether this reduction is due to the crisis or not. If reduction in export earnings can be derived from countries unaffected by the crisis, it is not a relevant factor of a transfer mechanism. This should be incorporated in the model.

- Problem of effects already accounted for

One problem which concerns the entire transfer mechanism reduced export earnings is that the effects of tourism and commodity prices will be accounted for when looking at export earnings as an indicator of export demand. Even though the first steps might add to the understanding of how export earnings will be affected, it seems logically problematic to analyze parts of export earnings and total export earnings on the same hierarchical level.

- Problem of no objective decision criteria

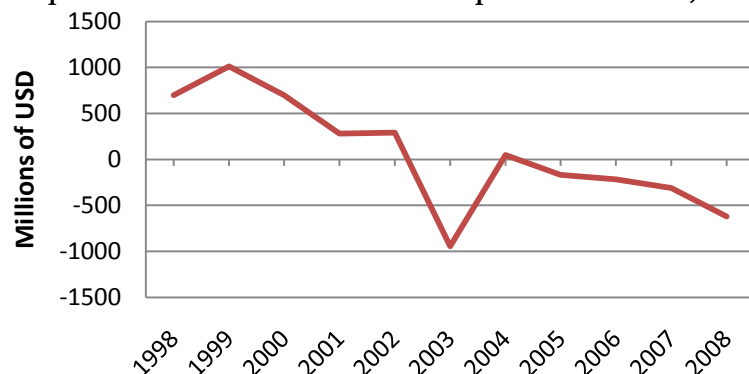
- Problem of importance

8.1.3 Reductions in financial flows

8.1.3.1 Official development assistance

For countries receiving ODA, the receipts might decline as an effect of the financial crisis in developed countries. As we see in Graph 7, Thailand has since 2005 had a negative net ODA, meaning that Thailand is actually giving more ODA than it receives. Therefore, this is not an applicable transfer mechanism for Thailand.

Graph 7: Thailand's net official development assistance, 1998-2008



Source: The World Bank Group, 2010

Problems encountered with this factor

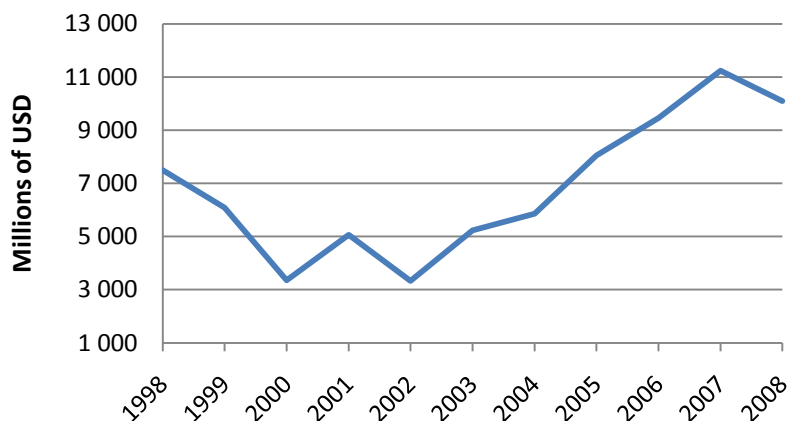
Had we concluded that this would have been a relevant transfer mechanism for Thailand, we would have still had the following problems:

- Problem of importance
- Problem of no objective decision criteria

8.1.3.2 Foreign direct investment

Looking on FDI inflows, we want to investigate whether or not there has been a reduction in correlation with the crisis. This would lead to negative effects for Thailand, as there would be less investment in the economy.

Graph 8: Foreign direct investment net inflows, 1998-2008



Source: The World Bank Group, 2010

As we can see in Graph 8, the FDI inflows continuously increased between 2003 and 2007 but decreased in 2008. The graph leads us to the conclusion that FDI is probably a relevant factor in the case of Thailand since it decreased by a relatively large amount in 2008.

Problems encountered with this factor

- Problem of assumption (C2)

The reduction in FDI could be a result of the unstable political climate, as it might have lead companies to reconsider and to look for other places to invest. This means that even though a reduction in FDI is concluded to be important for Thailand, we cannot conclude that the reduction in FDI is wholly due to the crisis. This further underlines the falsity of assumption (C2).

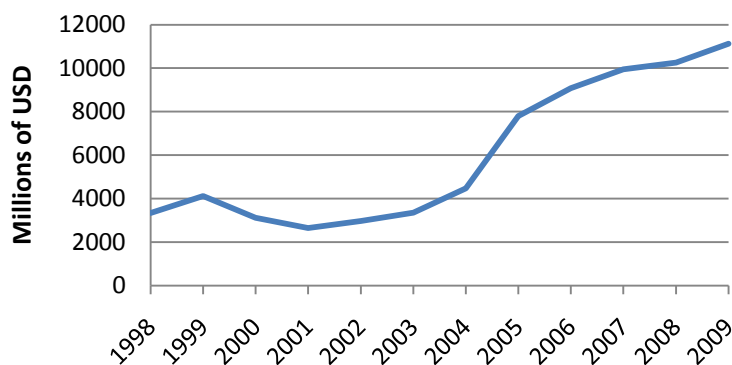
- Problem of no objective decision criteria

- Problem of importance

8.1.3.3 Short-term trade credit

The next part of reduction in financial flows is to look at whether there have been reductions in short-term trade credits in connection to the crisis.

Graph 9: Thailand's private enterprises short-term trade credits, 1998-2009



Source: Bank of Thailand, 2010d

As we can see from Graph 9, short-term trade credits have increased since 2001. The fact that it still increased during the crisis leads us to the conclusion that this is not a relevant transfer mechanism for Thailand.

Problems encountered with this factor

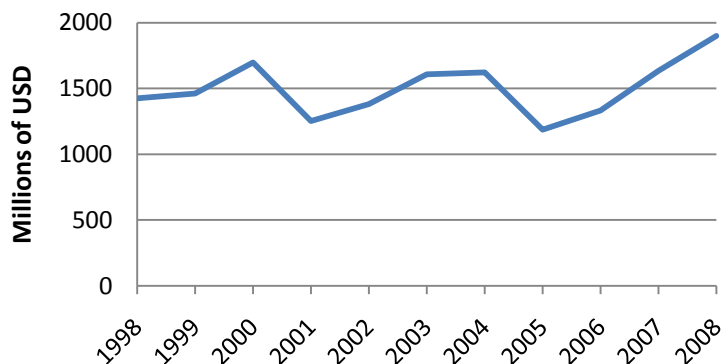
Had we concluded that this would have been a relevant transfer mechanism for Thailand, we would have still had the following problems:

- Problem of importance
- Problem of no objective decision criteria

8.1.3.4 Remittances

The last factor of the transfer mechanisms is remittances. Here, we want to investigate whether remittances received by Thai workers have declined in connection to the crises.

Graph 10: Thai workers' remittances and compensation of employees (received), 1998-2008



Source: The World Bank Group, 2010

Graph 10 shows that remittances have increased since 2005. This indicates that remittances is not a significant factor in the case of Thailand.

Problems encountered with this factor

If we had concluded that remittances would have been a relevant factor, we would still face the following problems:

- Problem of importance
- Problem of no objective decision criteria

8.1.4 Summary of problems encountered when applying transfer mechanisms on Thailand

Here follows a summary of the problems encountered when applying the transfer mechanisms on Thailand. These problems will be further addressed in Step 4, in which we will discuss possible solutions.

- Problem of importance

First, there is a reoccurring problem that the model as it is defined cannot say how important each relevant factor is to a country. This is a needed dimension in order to be able to say whether or not a transfer mechanism is strong, weak or not present.

- Problem of no objective decision criteria

Second, there are clear weaknesses in not having any defined decision criteria regarding the strength of the transfer mechanisms when using the model. This problem is relevant for all factors. Having no decision criteria allows for subjectivity, and thus reduces the possibility to use the model as a scientific tool.

- Problem of no defined choice of data

Third, there is a problem of no definition regarding what data one should use when applying the model. As there are currently no such specifications, there is a possibility of drawing different conclusions depending on which data you use. This reduces the objectiveness of the model.

- Problem of factor definition

Fourth, there are problems of weak factor definitions. When looking at some of the factors simply according to how the factors are defined, we fail to isolate the effects of the financial crisis as the

source of change. For example, when looking at reductions in export earnings we do not know whether this reduction can be derived from countries affected by the crisis or not.

- Problem of having no defined timeframe

Fifth, one problem encountered was that there is no defined timeframe for which data to take into consideration when analyzing the factors. Some of the conclusions drawn above depend on what time span you look at. Looking at short, medium or long term perspectives can lead to different conclusions. For example, a country can be negatively affected in the short term due to an initial shock, but in the long term fare relatively well due to well implemented stimulus packages.

- Problem of assumption (C2)

The application on Thailand has proved the assumption (C2) of the model to be false. We have identified political climate in Thailand, epidemics, natural disasters and national legislation as possibly having significant effect on the factors without being connected to the financial crisis. There are probably more factors that we have not accounted for, and this seriously undermines conclusions drawn from the model.

- Problem of effects already accounted for

One problem encountered was that it is problematic to look at commodity prices and tourism as parts of export earnings and look at export earnings as an indicator of export demand. This is problematic as the effects of the two first factors will be accounted for in the last factor.

- Problem of only looking at the sub factors of direct banking failures

Another problem is that we have only been looking at the sub factors of the transfer mechanisms instead of starting to look at the main transfer mechanism. The model would have more explanatory value if one would start to look at each transfer mechanism before looking at the sub factors. For example, it would be more interesting to look at the actual number of banking failures and/or changes in bank's earnings first and then to look at the factors to get an explanation of why changes occurred.

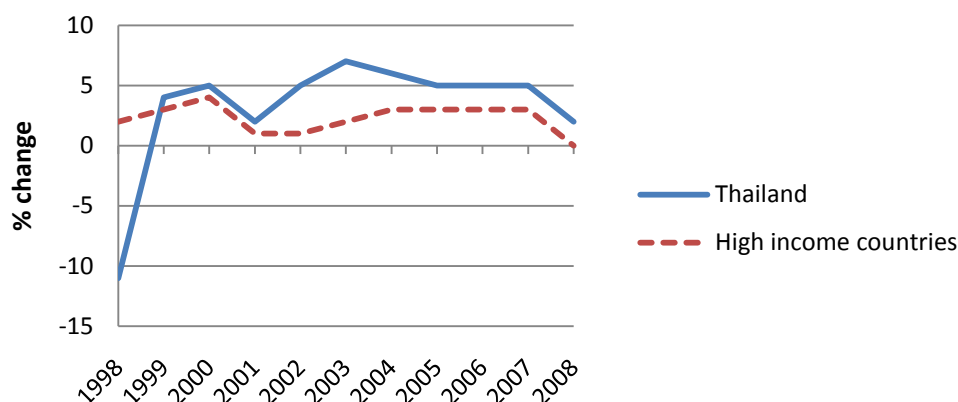
8.2 Cushion mechanisms

8.2.1 Economic growth

8.2.1.1 Previous growth period

If developing countries have experienced a previous growth period before the financial crisis, it means that developing countries have a higher buffer when it comes to drops in GDP growth rate. To examine whether this is the case for Thailand, we compare Thailand's GDP growth rate to the average growth rate of high income countries.

Graph 11: GDP growth rates, 1998-2008



Source: The World Bank Group, 2010

As Graph 11 shows, Thailand has had a higher GDP growth rate than high income countries since after the Asian crisis. As Thailand has experienced a period with strong growth, this should be a relevant cushion mechanism. This is confirmed by the fact that even though Thailand experienced a downturn during 2008, it still has a higher growth rate than high-income countries on average.

Problems encountered with this factor

- Problem of assumption (C2)

One criticism of this analysis is the probability of other factors having a significant effect on Thailand's growth rate other than the crisis. We have previously discussed domestic political turmoil as having significant effects on other factors and this criticism is applicable to this factor as well.

- Problem of no objective decision criteria

8.2.1.2 Decoupling of growth rates

In looking at whether Thailand has experienced decoupling of growth rates, we will compare Thailand's GDP growth rate to the growth rate of high income countries. This data can be found in Graph 11.

As we can see in Graph 11 there is no clear evidence that there has been a decoupling of growth rates for Thailand. Both Thailand and high income countries experienced declines in GDP growth during the IT crisis 2000. After that crisis, Thailand recovered relatively quickly, with an indication of decoupling of growth rates until 2004. However, in the start of the current financial crisis, GDP growth rate declined both in Thailand and high-income countries. This indicates that decoupling of growth rates is not a relevant cushioning mechanism for Thailand.

Problems encountered with this factor

- Problem of effects already accounted for

The analysis above makes us question whether decoupling of growth rates, which is a phenomenon that is defined in aggregates, is relevant for a model designed to be applied to single countries. It seems like the positive effects of such a phenomenon would be accounted for in the previous factor.

- Problem of no objective decision criteria

8.2.2 Better policies

Moving on to the next cushion mechanism, we will investigate which policies have been implemented after the Asian crisis. Naudé argues that better policies would have made Thailand more resilient to negative influence by the transfer mechanisms. The most extensive economic policy plan that has been implemented after the Asian crisis is the Financial Sector Master Plan (FSMP) (Nakornthab 2007, p. 22). We will focus on Phase I, which was implemented 2004-2008, in our analysis to determine if it has provided cushioning effects for Thailand.

The FSMP Handbook (Bank of Thailand 2006) lists three visions of Phase I: 1) broaden access to financial services, 2) increase efficiency of the financial sector, and 3) to improve consumer protection. As broadened access to financial services and consumer protection are not directly connected to cushioning effects of the crisis, we will focus on the second vision. It can be divided into two main sections: 1) streamlining rules and regulations and 2) rationalizing the structure and roles of financial institutions.

Streamlining rules and regulations has involved removing regulations that impede financial sector efficiency. This has involved improvements in regulations for risk management. For example, the Bank of Thailand has developed standardized approaches for credit and operational risk. One effect of improved risk management is that banks in Thailand have diversified their loan and revenue base since the Asian crisis, reduced earnings volatility and lowered the concentration risk associated with lending to larger companies (IMF 2009, p. 18). Streamlining rules and regulations has also involved improving corporate governance, for example through the identification of criteria for directors and senior managers of financial institutions. These two changes can be argued to have made Thailand more resilient against negative effects of the crisis, as diversification and improved corporate governance would lead to a more stable financial system.

As for the second section, the objective was to rationalize the structure and roles of financial institutions. For example, the Bank of Thailand has restructured the commercial bank licensing regime. This has led to a reduction in the number of deposit-taking financial institutions within the same conglomerate. Increased profits through economies of scale would mean a higher buffer for negative transfer effects of an international crisis.

Also, the second section has involved allowing foreign-owned financial institutions to play a bigger role in Thailand's financial system. The FSMP Handbook gives no explicit explanation as to why this change was made, but we find it probable to assume that this change in regulations was made to stabilize the Thai financial sector against similar, endogenous crises. This may have been a sound decision in the time of the Asian crisis, as they wanted to protect the economy from a similar shock. However, it actually *increased* the risk of transfer mechanisms as it opened up the Thai economic system to international financial companies.

As the FSMP Phase I seems to have had different effects in the sense of making Thailand more resilient to international financial crises, it is hard to draw any conclusion regarding its combined strength as a cushion mechanism.

Problems encountered with this mechanism

- Problem of no defined choice of data

As there are no definitions regarding how deep one should go in the analysis of policies, there is a problem of knowing how detailed the studies of these policies should be. This makes objective application of this mechanism difficult.

- Problem of no objective decision criteria

It seems even harder to define a decision criteria for this cushion mechanism than all of the previous mechanisms and factors, as previously factors have involved quantitative aspects. Here, it is hard to identify what real effects policies have had on the Thai economy. Policies that Bank of Thailand claims to have been implemented successfully might not have had any real effect on the economy. This further points out the weakness of predicting the effect on a country's economic outcome by only basing the analysis on qualitative grounds.

- Problem of effects already accounted for

As policies directly regulate the financial markets, one can argue the possible positive effects of this cushion mechanism will already have been accounted for by reducing the strength in the transfer mechanism direct banking failures. If this is the case, having it as a cushion mechanism would inflate the true effect of the policies as they would be counted twice.

8.2.3 Countercyclical packages

Countercyclical packages is the third and last cushion mechanism. In accordance with Naudé's theory, we will here list relevant stimulus packages, both by Thailand and by other countries that might have affected how Thailand will be affected by the crisis.

Looking at stimulus packages implemented by other countries, the US might be the most relevant example due to the size of their stimulus package. As of February 2009, the US had allocated 787 billion dollars stimulus packages as a direct result of the crisis (US Government 2010). This would lessen the effect of the transfer mechanisms, for example through not reducing export demand as much as it would have been reduced without the package.

Two domestic stimulus packages have been issued in Thailand (Sander et al. 2009, p. 25-26). The first stimulus package, SP1, was implemented between March and September 2009 while the second one, Thai Kem Kaeng Program (TKK) is being implemented now (2009-2012). The budget for SP1 was 93.4 billion baht or 1.1% of Thailand's GDP in 2009. TKK has a planned budget of 1.44 trillion baht, equivalent of 5% of Thailand's GDP for each of the three years 2010-2012. Without looking deeper into the focus areas and evaluating how these packages have been implemented, it is difficult to make a definite conclusion as to their cushioning effect. However, in connection to other stimulus packages such as the one in the US, it seems reasonable that countercyclical packages will have a cushioning effect even if we cannot determine its strength.

Problems encountered with this mechanism

- Problem of no objective decision criteria

It is difficult to evaluate and quantify the effects of these countercyclical packages. Not only is their effects difficult to quantify at the time of writing, the stimulus packages will probably have lagged effects on Thailand's economy and the TKK Program will not be fully implemented until 2012. As a result, conclusions regarding this cushion mechanism will be subjective.

- Problem of effects already accounted for

Even though stimulus packages implemented by other countries might also have positive effects on Thailand, the indirect positive effects for Thailand will be realized through e.g. a relatively strong export demand for Thai goods in general. If these countries would not have implemented stimulus packages, their import demand would probably have dropped lower. This effect, if it exists, is already captured by a reduction in the transfer mechanism of reduces in demand for Thailand's exports. The model as it is currently defined captures this effect twice, which may lead to false conclusions.

- Problem of countercyclical packages as a cushion mechanism

Even if the World Bank (Sander et al. 2009, p. 13-22) states that the stimulus packages implemented by Thailand have had positive multiplier effects on Thailand, the concept of stimulus packages having cushioning effects is not straight forward. The same report states that the withdrawal of stimulus packages must be timed well in order to avoid macroeconomic imbalances and negative expectations spiral. The World Bank also points out the fact that the resolutions of financial crises tend to be lengthy because of the need to rebuild balance sheets. A study by IMF (Scott 2008) has found that stimulus packages are typically less successful in emerging economies, because spending increases might make debt unsustainable and are likely to cause output to fall instead of rising. According to the study, the longer-term effects of stimulus packages are typically negative in emerging economies.

Since there are different opinions and arguments in favor of and against stimulus packages, it is difficult to predict the future outcome of them. This should be addressed by redefining this mechanism of the model.

- Problem of no objective decision criteria

8.2.4 Summary of problems encountered when applying cushion mechanisms on Thailand

Here follows a summary of the problems encountered when applying cushion mechanisms on Thailand. These problems will be further addressed in Step 4, when we will discuss possible solutions to problems encountered when applying the model on Thailand.

- Problem of assumption (C2)

The problem of the validity of assumption (C2) previously encountered was also encountered during the application of the cushion mechanism economic growth.

- Problem of no defined choice of data

There were further problems regarding the lack of definition of what data to analyze. Not only was the problem what data to choose, but also how detailed the analysis should be. This inhibits objective application of the model.

- Problem of no objective decision criteria

The problem of no objective decision criteria was even more problematic when applying cushion mechanisms than when applying transfer mechanisms. As two of the cushion mechanisms are hard to quantify, there is even more room for subjectivity when drawing conclusions.

- Problem of effects already accounted for

We argued that the positive effects of decoupling of growth rates are captured by the factor of previous growth period and some of the effects of better policies and of stimulus packages implemented by other countries than Thailand will already be accounted for in the transfer mechanisms. This is problematic, since this involves counting their effects twice which could lead to false conclusions.

- Problem of countercyclical packages as a cushion mechanism

Countercyclical packages was questioned as a cushion mechanism, as the effects of stimulus packages are not clear cut. There are different opinions regarding their effects on developing countries, as they could potentially have more adverse effects on a country in the long run due to increased debt.

9. Step 4: Evaluating and redefining the model

The last step before we can determine whether Naudé's theory is worth being further developed into a more formalized, applicable model is to evaluate and redefine the model based on lessons learned in Step 3. It is first after we have done this that we know if the problems encountered can be resolved or not. First, we will evaluate the validity of the second-order assumptions, since their validity is essential for the use of the model. Second, we will redefine the model based on what problems we encountered in Step 3. Third, we will list what criticism still remains after the redefinition of the model.

9.1 Evaluating the validity of the second-order assumptions

The first main assumption, (A1), divides the nations of the world into two groups: developed and developing nations. The second-order assumption in connection to this is:

(A2) First-order assumption A1 makes the problem under investigation more tractable.

This second-order assumption is determined to be valid. By making the simplification of dividing the world into two groups, we make the situation studied more tractable by not having to take stand in the validity problem that not even the UN has a clear definition of (UN Statistics Division 2010).

The second main assumption, (B1), states that the crisis is an exogenous shock for developing countries. Its second-order assumption is:

(B2) The model only applies to domains of which first-order assumption B1 is (approximately) true.

This second-order assumption has neither any problem with its validity. As the model is clearly based on a situation where a crisis is exogenous to the studied country, it needs no further ratification.

The third main assumption, (C1), stated that other factors than the financial crisis has no effect on the developing country's growth, and is connected to the second-order assumption:

(C2) Other factors than the financial crisis has negligible effects on the phenomenon under investigation relative to the purpose for which the theory is used.

(C2) has been seriously questioned during the application of the model. We have shown that the assumption is false, as other factors have significant effects on the mechanisms studied. Therefore,

both (C1) and (C2) will have to be excluded. As other factors cannot be excluded by an assumption, they will have to be incorporated into the parameters of the model.

9.2 Redefining the model based on problems encountered

The next part in Step 4 is to redefine the model based on the problems encountered during Step 3.

We first address the problem with assumption (C2). As it was not possible to isolate the phenomenon we want to study by using a negligibility assumption, the other affecting factors will have to be incorporated into the model. As they can both worsen the effects of the transfer mechanisms as well as act as cushion mechanisms (e.g. in the case of if national legislation inhibiting the effects of a transfer mechanism) they will be added as an extra parameter. For the user of the model, this means that she would have to keep these other factors in mind when applying both types of mechanisms of the model, and not determine the outcome of the mechanisms before having researched other possible affecting factors. During our application, we have identified epidemics, natural disasters, political turmoil or national legislation as potential affecting factors, but these are dependent on the specific context of Thailand. This is thus not a full list, and will have to be further developed if the model is concluded to have potential.

Next, we will address the problem of importance that concerned most of the transfer mechanisms.⁸ This problem can be resolved by redefining each transfer mechanism into a two-dimension mechanism, with the two dimensions *relevance* and *importance*. A mechanism needs to be determined to be both relevant and important for it to be concluded to be strong. With relevance, we refer to what we have done in the initial step of the application: identifying if effects of the transfer mechanism is present.⁹ By importance, we mean that you need to determine whether the transfer mechanism is large enough in the country's economy to have a significant impact, for example by comparing the size of the studied indicator to the country's GDP. If the factor is concluded to be relevant but not important, it is concluded to be weak. If the factor is concluded to not be relevant, it is enough to conclude it to not be present.

⁸ All factors except foreign owned banks (as a check of importance was made automatically with our choice of data), stock market and house market.

⁹ Or if the factors poses a risk of transferring negative effects of the crisis, if you use the model in connection with the event of a crisis when no data post crisis is yet available.

The next problem we would like to address is the problem of only looking at sub factors which occurred in the transfer mechanism banking failures. As we looked only at the factors explicitly mentioned by Naudé as being important for direct banking failures, we missed looking at whether there had been banking failures and/or declines in banks earnings. This problem can be addressed in modifying how the model should be used. Instead of focusing on the factors and sub factors where such are present, the user should first look at the transfer mechanism as a whole. If effects of this mechanism are present, then further analysis should be done by looking into the factors and sub factors. This further research would answer question of *why* the mechanism is or isn't changing, one of the aims of a model.

This new way of using the model also solves the problem of effects already accounted for in connection to export earnings. We found it logically troublesome to analyze both part of export earnings (as an indicator of export demand) and total export earnings on the same hierarchy. When starting by looking at export earnings explicitly, you no longer have this problem.

There were more factors that were connected to a problem where their effects were already accounted for. One was decoupling of growth rates whose positive effects, if any, would already have been accounted for in previous growth period. Therefore, in accordance with Ockham's razor, we take away decoupling of growth rates as a factor of the model, leaving previous growth period as a cushion mechanism on its own.

Another factor connected to the same problem is countercyclical packages of other countries than the country studied. These effects will be captured for example in export demand not being as adversely affected. As countercyclical packages of other countries are not really cushion mechanisms in the sense that they make the studied country more resilient, these will be removed from this cushion mechanism.

The cushion mechanism better policies was also connected to the problem of effects already being accounted for in the transfer mechanism direct banking failures. However, analyzing if implemented policies have had an effect on a transfer mechanism contributes to answering the question of *why* the transfer mechanism is weak or strong. For example, if banking failures is determined to be a weak transfer mechanism for a country, looking at policies could determine whether the mechanism is weak due to strong cushion mechanisms or if it is weak simply due to the fact that it is weak in itself. As this cushion mechanism makes this contribution, it should stay in the model. The fact that there

is a relationship between it and banking failures should be kept in mind by the user to avoid drawing false conclusions.

Another problem encountered was one of factor definition. This concerns the (sub) factors foreign owned banks, tourism and export demand. Concerning the sub factor foreign owned banks, this needs to be redefined to *foreign owned banks based in developed countries*, so that it becomes clear that the only foreign banks of interest are the ones based in developed countries. Otherwise, this sub factor violates one of the assumptions by not taking the differentiation of developed and developing countries into account. As for tourism, one way to reduce this problem is to change the definition of the factor to *tourism earnings from tourists from the developed world*. That way, you would better isolate what the model wishes to study. Even if the new definitions of these factors does not perfectly capture what the model aims to study, the question is whether the new definitions captures it good enough for the model to be useful, which further development of this model would have to be concerned with. To isolate the effects of the crisis on export demand, one would have to look further into changes in export earnings from the developed world, which would be a change in the use of the model, and not in its parameters.

There was also a question whether countercyclical packages could be regarded as a cushion mechanism due to the differing opinions regarding its actual effects on developing countries. The main problem with countercyclical packages is that they need to be financed and therefore can lead to future fiscal instability. Some studies (e.g. Sander et al. 2009 and IMF 2009) use fiscal sustainability as an indicator of whether a country will be able to repay loans taken in order to be able to implement the stimulus packages.¹⁰ Our suggestion is therefore to keep domestic countercyclical packages as a cushion mechanism, with the added dimension of studying the country's fiscal sustainability in the past as an indicator of whether or not the stimulus packages will have cushioning effects in the long run.

There was also a problem of having no defined timeframe. Our initial suggestion is to give greater weight to the patterns of the factor for the last few years, as it seems more likely that the same pattern would continue next year, and not a pattern that was present one or two decades ago. This is not a guarantee that the right conclusions will be drawn, as there are uncertainties of what will

¹⁰ Fiscal sustainability is defined by Heller (2005, p. 3) as “capacity of a government, at least in the future, to finance its desired expenditure programs, to service any debt obligations (including those that may arise if the created fiscal space arises from government borrowing), and to ensure its solvency”.

happen in the future. This is a problem that we cannot solve through redefining the model, and it will be addressed further in the next section.

In addition to discussing unresolved problems regarding having a model that makes predictions based on historical data, the next section will also discuss the identified problems of having no objective decision criteria and having no defined choice of data, as these problems cannot be resolved within the scope of this paper.

For a summary of the mechanisms and a visualization of the redefined model, see Appendix B.

9.3 Remaining criticism on the model after the redefinition

After redefining the model, some criticisms remain unsolved.

Perhaps the main criticism of the developed model is that there are no objective decision criteria defined for drawing conclusions on the two sets of mechanisms. There are no definitive criteria guiding the user in what the limits are for determining whether or not a mechanism is relevant, important, strong, weak or not present. A similar criticism is that there is no weight in the overall importance of each mechanism. Since there has been no test on how important each transfer or cushion mechanism is, we have no way of knowing how the mechanisms play out in reality. It might be the case that each of the cushion mechanisms is fulfilled, but one part of one transfer mechanism might be strong enough to still have a significant effect on the country. This means subjectivity must still be used when using the model as currently defined, which decreases its scientific status. If this cannot be solved, the model is not worth further development into a more formalized model. The scope of this paper has not allowed us to further research this issue on each of the mechanisms. Therefore, we cannot give a definitive answer on whether this would be possible to develop or not. As a result, this does not yet mean that the model should not be further developed, as one would have to study this further to know if it is possible to solve or not. Therefore, more research is needed on the importance of each factor, and to develop ways to quantify the impact of them.

Next, there is the criticism of having no definitions regarding which data to use. This was beyond the scope of this paper, but does not pose a real threat to the potential of developing Naudé's theory into a more formalized model. Defining which data to use could be achieved through further studies.

There is also the criticism that the solution to the falsity of assumption (C2) above is not sufficient. The incorporation of identified factors which can have significant effect on the mechanisms without originating from the crisis, such as domestic political instability, does not guarantee that all such factors have yet been taken into consideration. Application of the model on a single country does not enable that, and therefore further identification of such factors are needed should the model be concluded to be worth further development. But, even with further studies we will never know if we have identified all such factors. The relevant question to ask in further research is not if we have identified all such factors, but whether or not an omission is so critical that it leaves the model useless for understanding how developing countries are affected by the financial crisis.

A further criticism that has not been brought up during the application of the model is the use of historical data to make predictions for future outcomes. Whether or not this is an appropriate method is questionable, as the world is constantly changing. However, this is a criticism that many models face. Whether or not it is relevant for this model cannot yet be addressed, but will have to be further evaluated through attempts at falsification.

Finally, the model is not by far developed into a finished theory. Incorporating the lessons learned from applying the model on Thailand might have lead to wrongfully generalizing Thailand specific issues into the model. Therefore, further testing and evaluation of the model is needed to develop the model.

10. Summary and conclusion

The purpose of this essay has been to answer the question of whether Naudé's discussion paper is worth being further developed into a more formalized, applicable model to be used when analyzing the effects of the financial crisis on developing countries. To be able to achieve this purpose, we chose to take initial steps in the definition of such a model.

We first identified relevant theory of science to base the model on. Then, we defined a model based on the relevant scientific theory, keeping the model as close to Naudé's theory as possible. We then applied the model to Thailand in order to identify problems of the model. The identified problems were in a last step either addressed by redefining the model, or through a discussion whether the criticisms that could not be solved by redefinition meant that the model has no potential for further development. Some significant changes were made, such as the rejection of the assumption that other factors than the crisis has negligible effects on the country of study, and the incorporation of such factors in the model.

There were definitely some serious criticisms still remaining after the readjustment of the model. However, there were no criticisms identified which *at this point* definitely rejects the model could be further developed.

As such, we conclude that Naudé's theory is worth further development, as it could possibly be developed into a more formalized, applicable model to be used when analyzing the effects of the financial crisis on developing countries. However, there are many potential problems with such a model's applicability, as identified in the present stage of its development. Further studies should especially focus on the possibilities of determining decision criteria, choice of data for each mechanism and how to deal with the fact that other factors (unrelated to the crisis at hand e.g. political turmoil) have significant impact on financial performance.

As a finishing note, the model was set up to give an answer to the question whether or not it matters for a developing country that the epicenter of the financial crisis is in the developed world. Based on our application of the model on Thailand, we predict that Thailand will experience a decline in GDP growth rate for 2010, based on our conclusion that transfer mechanisms are stronger than cushion mechanisms in Thailand's case. In other words, it will not matter for Thailand that the epicenter of the crisis is in the developed world.

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11. Appendix A: The model as defined in Step 2

Assumptions of the model:

(A1) Countries of the world can be divided into two groups: developed countries and developing countries. These groups have defining differences, but countries within each group are not homogenous.

(A2) First-order assumption A1 makes the problem under investigation more tractable.

(B1) The studied crisis is an exogenous shock for developing countries.

(B2) The model only applies to domains of which first-order assumption B1 is (approximately) true.

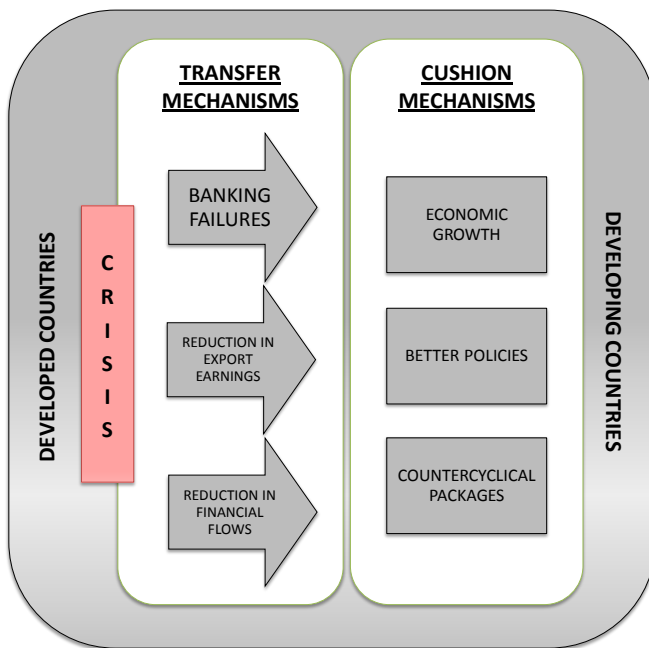
(C1) Other factors than the crisis are absent or has no effect on the studied developing country's growth

(C2) Other factors than the crisis has negligible effects on the phenomenon under investigation relative to the purpose for which the theory is used.

Figure 1: Transfer mechanisms and cushion mechanisms of the model as defined in Step 2

<u>Transfer mechanisms of the model:</u>	<u>Cushion mechanisms of the model:</u>
1) Banking failures a. Direct banking failures i. Inter-relationships with international banks ii. Foreign owned banks b. Indirect banking failures i. Stock market ii. House market 2) Reduction in export earnings a. Commodity prices b. Tourism c. Export demand 3) Reduction in financial flows a. Official development assistance b. Foreign direct investment c. Short-term trade credit d. Remittances	1) Economic growth a. Previous growth period b. Decoupling of growth rates 2) Better policies 3) Countercyclical packages

Figure 2: A visualization of the model as defined in Step 2



11. Appendix B: The model as redefined in Step 4

Assumptions of the model:

(A1) Countries of the world can be divided into two groups: developed countries and developing countries. These groups have defining differences, but countries within each group are not homogenous.

(A2) First-order assumption A1 makes the problem under investigation more tractable.

(B1) The studied crisis is an exogenous shock for developing countries.

(B2) The model only applies to domains of which first-order assumption B1 is (approximately) true.

Figure 3: Cushion mechanisms and transfer mechanisms of the redefined model and their factors and sub factors as defined in Step 4

Transfer mechanisms of the model:

1) Banking failures

- a. Direct banking failures
 - i. Inter-relationships with international banks
 - ii. Foreign owned banks based in developed countries
- b. Indirect banking failures
 - i. Stock market
 - ii. House market

2) Reduction in export earnings

- a. Export demand
- b. Commodity prices
- c. Tourism earnings from tourists from the developed world

3) Reduction in financial flows

- a. Official development assistance
- b. Foreign direct investment
- c. Short-term trade credit
- d. Remittances

Cushion mechanisms of the model:

1) Previous growth period

2) Better policies

3) Domestic countercyclical packages

- a. Fiscal sustainability

Figure 4: A visualization of the model as redefined in Step 4

