ERASMUS UNIVERSITY ROTTERDAM

The speediness of recoveries from recessions in co-occurrence with exogenous shocks

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Specialisation: Financial Economics

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11 June 2019

AKNOWLEDGEMENTS

The present research will be the last hurdle I take in obtaining my master's degree in Financial Economics. Looking back at the long route I travelled in order to complete the present research, I would like admit that finalising this thesis has formed both some of the most valuable and unpleasant memories of my academic education. Breakthroughs in Stata made me feel pure joy. However, combining the research process with a demanding job as a lawyer, working endless sessions beyond midnight, have at times felt like suffering. I must admit that I have grown a lot as a result of this process and that I am proud of the result.

I would like to express my sincere gratitude to my thesis supervisor dr. Volosovych for his patience, guidance and support.

Moreover, I would like to thank Ava, Folmer and Wouter for providing feedback on earlier versions of this work.

Lastly, I would like to thank my parents for enabling me to pursuit my academic interests.

Thank you!

Anton Graafland

ABSTRACT

This research investigates the speed of economic recovery in the first expansion year after a recessionary period that was accompanied by an exogenous shock. Boom-busts in commodity prices proxy for exogenous real shocks, while boom-busts in capital inflow proxy for exogenous financial shocks. A simultaneous bust in commodity prices and capital inflows – a so called double bust – also proxies for an exogenous shock.

The main hypothesis tested in this research is that recoveries from recessions that were accompanied by exogenous real and financial shocks are slower than recoveries from recessions not accompanied by these respective shocks. First, for exogenous real shocks, the main hypothesis is expanded to test for the existence of an asymmetry between resource dependent and non-resource dependent economies in the speediness of recoveries from recessions accompanied by real shocks. Second, for exogenous financial shocks, the main hypothesis is expanded to test whether recoveries from recessions accompanied by debt-like capital inflows are slower than recoveries from recessions accompanied by equity-like capital inflow.

The present research builds on a panel data dataset containing yearly commodity price data, resource dependence data and capital inflow data, consisting of 130 countries over the period 1980 – 2015. Numerous recovery dummies are programmed using a straightforward and easily replicable methodology, using the algorithm developed by Bry and Boschan (1971). The hypothesis are tested employing an extended version of the fixed effect model of Cerra, Panizza and Saxena (2013).

The present research finds mixed and inconsistent evidence that boom-busts in commodity prices around a recessionary phase are associated with slower subsequent recoveries. Recoveries from recessions accompanied by boom-busts in different capital inflow measures are found to be slower than recoveries from recessions not accompanied by these respective shocks. The distinction between net and gross capital inflow measures is found to be relevant. With respect to commodity price-related exogenous shocks, weak and inconsistent evidence is found for the existence of an asymmetry between resource dependent and non-resource dependent economies in terms of the speed of economic recovery from the recessionary phase. The results do not provide evidence that recoveries from recessions accompanied by boom-busts in debt-like capital inflows are slower than recoveries from recessions accompanied by equity-like capital inflows. If anything, the results indicate the opposite.

Future research into the validity of the findings of this research is encouraged. Recommendations include the use of quarterly data and the use of more enhanced measures for an economy's dependence on natural resources.

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1 INTRODUCTION

1.1 Motivation

With daily headlines on persisting trade wars and the re-evaluation of trade policy by governments, potentially affecting industries, jobs and local citizens in many regions of the world, it is apparent that the world economy is, both in term of trade and finance, more integrated than ever before. The interlinkages of economies in all regions on earth has provided tremendous benefits to many all over the globe. Poverty has been reduced and across generations the prospects for a better future have improved. However, numerous illustrations have shown that that globalisation brings vulnerabilities to exogenous shocks as well.

As a result of the complex interlinkages between real economies and financial sectors, the collapse of Bear Stearns and Lehman Brothers a little more than ten years ago, had far reaching global impact. While the world economy has recovered since then, it once again became apparent that the vast amount of interlinkages and interdependencies come with substantial vulnerabilities to exogenous shocks.

Exogenous shocks are potentially very costly for an economy in terms of output losses. Becker and Mauro (2006) show that terms of trade shocks[1] and exogenous financial shocks – for example a sudden collapse in an economy's capital inflow - are most costly in terms of output loss. The output drops associated with exogenous shocks are more common in poor economies. Cerra and Saxena (2008) show that negative shocks lead to divergence in income levels across countries and lower long-run growth rates. Historical comparison indicates that declines in real economic activity are especially large when recessions are accompanied by periods of deep financial disruption (Claessens, Kose and Terrones, 2012). Furthermore, Krugman (2014) argues that exogenous shocks and associated crises *"(…) tend to cast a long shadow over subsequent economic performance."*

Exogenous shocks are expected to have an adverse effect on economic growth and are amplified through mechanisms that operate through the balance sheets of countries, firms and households, having persistent effects on the equilibria in many interacting markets, among these equilibria is the equilibrium between savings and investments (Claessens et al., 2012).

For decades the dominant interest of scholars in the economic growth literature was to gain insights into the determinants of long-run economic growth using cross sectional regression techniques (Cerra and Saxena, 2007). However, over the years academic interests in short-run growth acceleration and deceleration has gained in popularity, which is attributed to the fact that scholars have found it challenging to identify robust, long-run growth determinants and have only been moderately successful in presenting practical advice (Funke, Granziera and Imam, 2008). The present research builds on the latter strand of the academic growth literature and investigates economic performance subsequent to recessions accompanied by exogenous shocks, whereby exogenous shocks are classified in real exogenous shocks and financial exogenous shocks. Indices of worldwide commodity prices are used as proxy for real exogenous shocks and capital inflow data is used as proxy for financial exogenous shocks.

1.2 Research question

The research question of the present research is:

Are recoveries from recessions accompanied by exogenous real shocks and exogenous financial shocks slower than recoveries from recessions without these shocks?

To answer the research question, a basic hypothesis and two additional hypotheses are

[1] The terms of trade of a country is defined as the relative price of a country's exports in terms of its inputs. Terms of trade shocks are shocks resulting from (sudden) shifts in global markets leading to changes in import or export prices, hereby affecting economic growth in an economy. The individual economy generally has no influence on the shift in global markets.

tested. The goal of the main hypothesis is to assess whether recoveries from recessions accompanied by an exogenous shock are slower than recoveries without these respective shocks. With the first additional hypothesis, the growth asymmetry between resource dependent and non-resource dependent economies is assessed. For the second additional hypothesis exogenous financial shocks are subdivided in shocks proxied by debt-like and equity-like capital inflow. For the additional hypotheses, the distinction between real exogenous shocks and financial exogenous shocks is relevant. Real exogenous shocks are relevant in relation to the first additional hypothesis, while financial exogenous shocks are relevant for the second additional hypothesis. The goal is to assess whether the type of capital inflow with which the recessionary phase is associated, is relevant for the speed of subsequent economic recovery.

1.3 Data, methodology and model specifications

The present research builds on a panel dataset consisting of 130 countries over the period 1980 – 2015. For the real exogenous shocks Commodity Price Data from the World Bank is used. The World Development Indicators are used as a proxy for a country's resource dependence. For the capital inflow data, this research relies on the rich dataset from Alfaro, Kalemli-Ozcan and Volosovych (2014). All data collected is yearly data.

Using the panel data, dummies are programmed that proxy recoveries from recessions accompanied by various exogenous shocks. Recovery is defined as the first year of positive economic growth after a spell of negative growth years. Most shocks are proxied by boom-busts in the commodity price and capital inflow data. For the purpose of programming the dummies, the boom-busts cycles are identified and their amplitudes are calculated. Whether a boom-bust is considered a shock is defined on the basis of the amplitude of the boom and the bust. The 50^{th} percentile is taken as a threshold value for most shocks, meaning that if the amplitude of both (i) the boom phase is above the 50^{th} percentile of all booms in the sample and (ii) the bust phase is below the 50^{th} percentile of all busts in the sample, the boom-bust is considered a shock. Recoveries from recessions accompanied by an exogenous shock are separated from those not accompanied by an exogenous shocks.

For the testing of the hypotheses of the present research, the fixed effects model of Cerra, Panizza and Saxena (2013) is extended. As the focus of this research is on the growth dynamics during recoveries, - which are positive growth years by definition - the dependent variable only includes positive growth years. Hence, the aforementioned recovery dummies indicate the speed of economic expansion after a spell of negative growth years relative to all other expansion years. Testing for the difference between the beta estimates of the different recovery dummies, enables one to infer whether recoveries from recessions accompanied by specific shocks are slower than recoveries from recessions without these respective shocks. One-sided Wald-tests are performed to test whether the estimated beta coefficients are statistically significantly different from each other.

1.4 Societal and academic relevance

The present research contributes to the existing literature in several ways. To the best of my knowledge and belief, scholars have not investigated the growth dynamics of economic recoveries from recessions accompanied by boom-busts in commodity prices and capital inflows relative to recoveries not accompanied by these respective shocks. It is shown that this can be assessed using a straightforward methodology that is easily replicable. Besides real and financial exogenous shocks, this research also attempts to combine these two shocks, building on the phenomenon of the double bust as introduced by Reinhart, Reinhart and Trebesch (2016). A double bust refers to a simultaneous bust in commodity prices and capital inflows. While Reinhart et al. (2016) have identified double busts at the world level, in this research a first attempt is made to identify double busts at the country level. Another contribution is made by further exploring the relevance of the distinction

between gross and net capital inflow measures (e.g. Forbes and Warnock, 2012).

In general, a better understanding of the relative growth dynamics during recoveries from recessions accompanied by exogenous shocks is relevant for policymakers and investors. The findings of this research may provide policymakers and investors with insights into the exogenous shocks that matter in terms of the damage they cause. This allows policymakers to focus their limited resources more target-orientated on mitigating the more painful recessions, e.g. ensuring foreign credit lines in terms of uncertainty. A better understanding of the relative performance during recoveries from recessions accompanied by exogenous shocks helps investors with a worldwide investment strategy, e.g. by reducing equity and bond exposure during recoveries from recessions accompanied by an exogenous shock that is particularly damaging.

1.5 Thesis outline

This research is organised as follows. In Section 2, the theoretical framework is presented, which will start with conceptualising the transmittance of input volatility – such as exogenous shocks – on real economic performance. This conceptualisation serves as a building block on which the remainder of the theoretical framework is build. Additionally, the role of commodity prices and capital inflows on real economic activity is examined, also discussing the dynamics typically seen in resource dependent economies and exploring the complex interaction between the financial sector and real sector. Towards the end of Section 2, the concept of economic recovery is discussed and the hypotheses of the present research are substantiated. Section 3 contains the research design, which elaborates on the data and methodology employed. The empirical results of the present research are presented in Section 4. Section 5 will state the conclusions and limitations of this research, as well as the implications for further research.

2 THEORETICAL FRAMEWORK

The section provides the context necessary for substantiating the central question and hypotheses of this research. As has been shown by scholars, a guiding principle of this research is that financial shocks and real shocks are amplified through mechanisms that operate via the balance sheets of countries, firms and households. The central idea behind these mechanisms is the following. An increase (decrease) in assets prices comes with an increase (decrease) in the net worth of countries, firms and households. The increase (decrease) in net worth translates to increased (decreased) lending, borrowing and spending capacity, which results in a further increase (decrease) in asset prices and has an effect on the equilibria in many interacting markets, also referred to as general equilibrium (Claessens et al., 2012).

One of the equilibria that is directly or indirectly impacted by real and financial shocks is the equilibrium between savings and investments. It takes time for the balance between savings and investments to restore, because general equilibrium effects are persistent. In the end of this section, the hypotheses for the present research are presented. Following the line of reasoning presented in this theoretical framework, the main hypothesis is that recoveries from recessions accompanied by real or financial shocks are expected to be slower than recoveries from recessions not accompanied by these respective shocks. At the core of this expectation is the persistence of the distorted balance between savings and investments.

A large part of the theoretical framework deals with the interaction of exogenous shocks with real economic activity. While these mechanisms primarily relate to the long-term relation between shocks and real economic activity. Understanding recoveries starts with a deeper understanding of the interacting mechanisms of shocks and economic growth, as exogenous shocks are often associated with recessionary periods preceding the recovery. Also, recoveries are conditional on the occurrence of the recessionary periods. Therefore, it is crucial to have a better understanding of these periods.

The outline of this section is as follows. First, a conceptual framework is presented in § 2.1., which provides a deeper understanding of how shocks are transmitted into the real economy from a conceptual perspective. This is followed by a more general analysis of the long-term interacting mechanisms between boom-busts in commodity prices and economic growth, especially in economies that are heavily reliant on the export of natural resources (§ 2.2.). Next, the key dynamics between the financial sector and the real economy are discussed (§ 2.3). The goal is to provide insight in the interlinkages between capital inflows, domestic financial markets and economic growth. This discussion is relevant since boom-busts in capital inflows distort the link between savings and investments in an economy. Therefore, these boom-busts in capital inflows are relevant for the speed of economic recovery after a recessionary period. Finally, the concept of economic recovery is discussed (§ 2.4) and the hypotheses of the present research are presented (§ 2.5).

2.1 A general framework: volatility, shocks and economic performance

Over the years scholars have demonstrated growing interest in topics related to the management of volatility and crises. Since the work of Ramey and Ramey (1995), many studies have found evidence for a significant adverse effect of macroeconomic volatility on long-term economic growth, and this effect is found to be more pronounced in poorer economies. Considerable efforts have been taken by scholars into gaining a deeper understanding of the effects of macroeconomic volatility on economic growth and the interlinkages between volatility, shocks and crises (Aizenman and Pinto, 2005).

Before the relation between macroeconomic volatility and (long-term) economic growth is discussed, a conceptual framework presented by Wolff (2005) is presented, which is considered useful for a better understanding of

the interaction between volatility, shocks, crises and economic growth.

Wolff (2005) argues that shocks and their sources can be distinguished in (i) exogenous shocks stemming from exogenous volatility and (ii) endogenous shocks stemming from endogenous volatility. Primary difference is that exogenous shocks are not within the short term grasp of policymakers and other economic actors, while endogenous shocks often stem from within a country.

The difference between the two sources of volatility is best illustrated by some examples. With respect to exogenous volatility one can think of the following examples:

(a) sharp declines in crude oil prices have an adverse impact on economies that heavily rely on the export of crude oil; or

(b) an increase in the interest rate set by the FED or ECB results in investor's pulling away from emerging and developing economies towards US or European treasuries as the expected returns of these assets have increased. The potential results is a sharp decline in capital inflows to emerging and developing economies.

Both of these examples form an illustration of exposure to exogenous volatility of an economy, as the fluctuations in commodity prices and capital inflows are not within the short-term grasp of policymakers.

Endogenous volatility stems from within, meaning that policymakers or the institutions in a country are in the core themselves responsible for the caused volatility, e.g. unstable macroeconomic policy measures taken by a country's central bank, a malfunctioning political landscape or unsustainable fiscal policy.

While strict definition between the two types of volatility is interesting from a conceptual perspective, Wolff (2005) argues that it is more appropriate to consider the interactive nature of the relation between exogenous and endogenous volatility. Of course, the shock effect generated by a sudden drop in oil prices has the characteristics of an exogenous shocks. However, the persistent vulnerability to fluctuations in oil prices, may very well be the results of failing policy measures.

In short, the key idea of the conceptual framework of Wolff (2005) is that a shock is a manifestation of input volatility that exerts impact on output volatility and economic growth through one (or many) transmittance channel(s). Examples of these transmittance channels are factor accumulation through investments, domestic finance , capital mobility and politics.

A central goal of this theoretical framework is to elaborate on many of these transmittance channels, whereby the primary focus is on the role of commodity price volatility (in resource dependent economies) and capital inflow volatility.

2.2 Investments, institutions and Dutch Disease in resource dependent economies

The focus of this subsection is on the typical long term effects of commodity price volatility on the earning capacity in resource dependent economies, whereby the transmittance of commodity price volatility commodity price volatility – which translated into volatility in commodity export revenues – and economic growth is analysed.

Resource dependence refers to the reliance of an economy on the export of natural resources in its economic composition (Brunnschweiler and Bulte, 2008). In theory commodity export revenues can be considered a blessing for resource dependent economies, as these revenues are expected to have a positive impact on the disposable income in an economy. Under the assumption that domestic agents exhibit a positive marginal propensity to save, the increase in disposable income will lead to an increase in domestic saving and, hence, a decrease of the domestic interest rate. In turn, the lower interest rate will spur domestic investments and growth (Devlin and Lewin, 2005).

However, the concept of the 'resource curse' introduced by Auty (1993) points to the

existence of different perspectives on this 'blessing'. The concept of the resource curse refers to the tendency of natural resource dependent economies performing poorly in terms of economic growth. The resource curse has become a central concept in the analysis of the nexus between natural resources and economic growth by scholars and policymakers.

In relation to resource dependent economies, the guiding principle discussed above is best summarised as follows. Booming commodity prices increase the net worth of a resource dependent economy, its firms and its households. This results in an increased lending, borrowing and spending capacity, further increasing asset prices, affecting equilibria in many markets, among them the equilibrium between savings and investments. Once the commodity price boom ends – or: when investors expect the commodity price boom to end –, the net worth of the resource dependent economy, its firms and its households decrease, together with the lending, borrowing and spending capacity of an economy. This has an adverse and persistent impact on the relation between savings and investments, thereby commodity price volatility in the recessionary phase is ultimately affecting the speed of economic recovery.

In the remainder of this subsection the role of investments (§ 2.2.1) and the role of institutions and politics (§ 2.2.2) is discussed. Furthermore, a phenomenon named 'Dutch Disease' is discussed (§ 2.2.3). Also, the earlier mentioned, interactive nature of exogenous and endogenous volatility is discussed in the context of procyclicality (§ 2.2.4).

2.2.1 Investments

Building on the conceptual framework presented in § 2.1, the investment channel is crucial in the transmittance of input volatility on economic growth (Dehn, Gilbert and Vangis, 2005). Investments result in the accumulation of factors, such as human capital or fixed assets like plant equipment (Wolff, 2005). In a classic investor's risk-return framework, the investor's investment decision depends on the expected return in relation to the investor's risk tolerance. Under the assumption that the investor is risk adverse, input volatility - or any other measure of macroeconomic volatility - is likely to depress investments (Perry, 2009). Bernanke (1983) argues that that increased volatility leads to lower investments. Also, volatility can incentivise economic actors towards the investments in capital goods that are easily reallocated in the aftermath of a shock, rather than towards investments in long-term, specialised investments that contribute to long-term economic growth (Wolff, 2005).

For resource dependent economies, commodity price volatility – more specifically the volatility of commodity export revenues – is expected to adversely affect the investment climate, as the increased macroeconomic volatility implies more risk. If the resource dependent economy experiences repetitive boom-busts in commodity export revenues, the commodity price volatility is likely to get transmitted in the real exchange rate. This will translate in high risk premia in the non-commodity sectors of resource dependent economies, having a depressing effect on investments in those sectors (Devlin and Lewin, 2005). In this respect Deaton and Miller (1995) have found that of all components of GDP the strongest effect of fluctuations in commodity price on economic growth is through the channel of investments. Similarly, Blattman, Hwang and Williamson (2007) have found that commodity price volatility primarily affects growth through foreign investments.

2.2.2 Institutions and politics

Frankel (2012) argues that resource dependence can have an adverse impact on a country's institutional quality as resource wealth increases the likelihood of graft, corruption and civil war. By referring to Besley and Persson (2010), Beck (2012) puts forward that the natural resource curse is associated with distorted investment incentives. Governments focus on short-term gains realised with export of commodities and refrain from investments in (long-term) institutions, education and public services as these investments are not easily converted into cash. Unfortunately, opting for

short-term gains implies that resource dependent economies are less likely to explore the creation of new markets and invest in human capital and research and development. In turn, the incentive for the development of a proper institutional framework that facilitates long-term production opportunities outside the commodity sector is highly reduced. Beck (2012) also refers to the conjecture developed in Beck and Leaven (2006) that countries that are reliant on the export of natural resources enhance the opportunities of the elites to engage in rent-seeking behaviour. Rent-seeking behaviour refers to behaviour of government officials or politicians to obtain economic rent by manipulation instead of through facilitating new, real growth opportunities. This rent seeking behaviour is expected to result in the deliberate hindrance of the development of a strong institutional framework. In the empirical work of Mehlum, Moene and Torvik (2006) it is found that the quality of institutions plays a crucial role in explaining growth differentials between resource dependent economies. Resource wealth appears to raise aggregate income when institutional quality is high, while an institutional framework that allows for opportunistic behaviour results in a decrease of aggregate income.

2.2.3 Dutch Disease

Resource dependence can adversely impact economic growth through the real exchange rate. Increased commodity export revenues are associated with an appreciation of the currency, making the non-commodity export sector less competitive. In case other exporting sectors are uncompetitive, they run the risk of getting crowded-out, hindering economic diversify-cation (Frankel, 2012). Scholars often refer to issues in resource dependent economies that arise in relation to the upward pressure on the real exchange rate as 'Dutch Disease. Besides the appreciation of the real exchange rate, some of the main symptoms of Dutch Disease mentioned by Frankel (2010) are: i) an increase in government spending ii) an increase of the relative price of nontraded goods versus traded goods iii) the movement of resources – capital, labour and land – away from the non-commodity exporting sector into the commodity exporting sector and domestic sector iv) high interest rates in turn attracting (additional) capital inflows and v) a deficit in the current account. Devlin and Lewin (2005) put forward that the real problem for resource dependent economies is not with the symptoms of Dutch Disease, but rather with the fact that booming commodity export revenues are not permanent since commodity prices are very volatile by nature. Once the commodity price booms ultimately comes to an end and commodity export revenues fall, the currency tends to be overvalued. The movement of many resources away from non-commodity exporting sectors is not easily reversed and as a result the non-commodity exporting sectors are difficult to revive, even after a depreciation of the currency.

2.2.4 Interlinkage of channel

The different channels that play a role in the transmittance of a country's resource wealth on economic growth have the tendency to be interlinked. For example, the phenomenon of Dutch Disease is actually closely related to the channel of institutions and politics. Many other key variables play an important role in the context of Dutch Disease, such as fiscal and monetary policy. Frankel (2012) argues that the pronounced economic cycles in resource dependent economies could be significantly reduced if fiscal and monetary policy would take into account the cyclicality of business cycles. While some cyclic variability would inevitably remain, adhering to intertemporal optimisation would be very beneficial. Resource dependent economies are advised to use the financial markets in order to deal with commodity price volatility by borrowing in times of economic downturn, while repaying debt or engage in the accumulation of net foreign assets in times of economic prosperity. Unfortunately, in practice many resource dependent economies resort to procyclical policies prompted by political forces.

In order to counter procyclicality in the long-run, Frankel (2010) argues that governments would be helped with longer-term institutions to counter short-term political pressure; awareness

of the undesirability of procyclical policies is not considered to be enough. A similar notion is made by Devlin and Lewin (2005), who argue that the overspending of the government during boom episodes is considered to be one of the root causes for amplified business cycles in resource dependent economies. Under the assumption that governments are able to identify positive net present value investment projects, using the commodity export revenues will contribute to economic welfare. However, besides increased investments, booming commodity export revenue are also closely associated with increased government expenditure in the form of wages, and expenditure on education and healthcare. Increased government expenditures can have lasting effects as public expectations are raised, making it difficult to adjust expenditures once the booming commodity markets crash. The problems related to government overspending are expected to be even more severe in small economies since government spending is typically responsible for a significant share of aggregate demand. Irrespective of all the transmittance channels at play, the real economic effects of commodity export revenues are primarily determined by the impact of these revenues on consumption, investments and government expenditure.

2.3 Dynamics between the financial sector and the real sector

While the free flow of capital between economies allows for a more efficient allocation of resources, this phenomenon of 'financial liberalisation' also comes with inherent dangers, that may damage real economic sectors rather than bringing them to fruition. Business cycles can be seriously affected by the free flow of international capital. The effects of boom-busts in capital inflows on the business cycle of an economy are persistent, ultimately affecting economic recovery after a recessionary phase. For the understanding of how shocks affect economic growth, it is essential to analyse the dynamics between the financial sector and the real economy. This subsection provides a picture of how capital inflows and real economic activity interact.

In the remainder of this subsection the concept of 'financial liberalisation' is introduced and some of its inherent dangers (§ 2.3.1), the course of a typical boom and bust cycle in capital inflows is illustrated (§ 2.3.2) and the role of boom-busts in domestic financial markets and the interlinkage between these financial markets and the real economy is elaborated upon (§ 2.3.3). Furthermore, the role of credit as a key link between savings and investments (§ 2.3.4) and the distinction between credit-driven, equity-driven is touched upon (§ 2.3.5). Finally, the link between commodity prices and capital inflows in resource dependent economies is discussed (§ 2.3.6).

2.3.1 Dangers inherent to financial liberalisation

The increased capital mobility across the world is the result of the process of financial liberalisation. From the balance-of-payment accounting identities follows that domestic savings should equal domestic investments in a closed economy. Economies can remove this constraint by opening their capital account. Economies with an open capital account are able to finance domestic investments by attracting foreign savings. The rationale behind capital mobility is that it raises productivity and economic growth by allowing for the efficient allocation of resources (Ahmed and Zlate, 2014; Aizenman, Jinjarak and Park, 2013). In the neoclassical model, financial liberalisation is ought to lead to a temporary increase in the growth rate of GDP per capita. Therefore, it is argued to permanently improve the standard of living in a country (Henry, 2007).

Initially, the strong theoretical arguments in favour of financial liberalisation led to strong support of financial liberalisation by policymakers. However, severe financial crises in the '80s and '90's in Latin America, East Asia and Russia caused for a re-evaluation of the desirability of full capital account liberalisation. Stiglitz (2000), who was among the first to warn for the inherent dangers of full capital account liberalisation, stated that *'one might compare capital account liberalization to putting a race car engine into an old car and setting off*

without checking the tires or training the driver.' It became apparent that even countries with relatively sustainable financial policies and institutions could face tremendous danger as a result of capital account liberalisation, as capital account openness at some point may also facilitate capital flight (Stiglitz, 2000; Eichengreen, Gupta and Mody, 2008).

2.3.2 The characteristics of a typical boom and bust cycle

For a better understanding of the linkages between different financial variables and the real economy, it is useful to elaborate on the characteristics of a typical boom and bust cycle in capital inflows. These characteristics have been extensively discussed in the academic literature (e.g. Reinhart and Reinhart, 2008; Claessens and Kose, 2013; Müller-Plantenberg, 2017). The start of a boom phase in capital inflows is often associated with rising real expected returns in an economy. Causes for rising real expected returns may stem from i) specific pull factors – e.g. the country opts for capital account liberalisation or the discovery of natural resources – ii) external push factors – e.g. monetary policies of the FED or ECB, or iii) an interplay of both push and pull factors. For the sake of this illustration, it is assumed that the rise in real expected returns stems from booming commodity export revenues in an economy. The result of rising real expected returns in an economy tends to be an (abnormal) increase in an economy's capital inflows and booming (local) asset markets. The boom in local asset prices is often followed by domestic credit expansion - implying an increase in domestic investments -, an increase in private consumption and ultimately economic growth. Some of the typical characteristics of the boom phase in capital inflows can also be considered early warning signals. These characteristics - or warning signals - are decreasing domestic saving rates, deteriorating current accounts - either a decrease of the current account surplus or an increase of the current account deficit - and an appreciation of the currency. The country's central bank may or may not resort to sterilisation operations - this is often done by increasing the money supply - in an attempt to tackle the appreciation of the domestic currency. Sterilisation measures taken by the country's central bank pose new challenges. The increased money supply is likely to result in inflationary pressures that force the central bank to increase commercial bank reserve requirements, in turn pulling a brake on credit expansion. The real pain, however, often only surfaces once the boom in capital inflows is coming to an end. The transition from the boom to the bust phase in capital flows may come in different forms. As put by Reinhart and Reinhart (2008) *"(…) an inflow bonanza can end with a bang or with a whimper"*. The start of the bust phase is usually around the corner when foreign investors start to realise that their initial expectations of the country's return prospects may have been too optimistic and start liquidating their positions, with plummeting domestic asset markets as a result. With the bust in capital inflows comes the imminent threat of financial crises and recession. Countries and firms may suddenly experience difficulties in the refinancing of existing loans. If a country can no longer finance its current account deficit, the deficit has to be closed by a simultaneous drop in domestic investments, imports and the exchange rate. This process is likely to be detrimental for any economy.

2.3.3 Domestic financial markets: credit, equity and real estate markets

Domestic financial markets can considerably affect the business cycles of economies. Claessens and Kose (2013) stress that boom and bust cycles in domestic credit markets and domestic asset prices are the source of financial crises in many theories that attempt to uncover the sources of financial crises. In theory, boom-busts in credit markets and domestic asset prices can adversely impact an economy through two transmittance channels. First, as firms use collateral for loan arrangements, a decrease in the collateral's market price is expected to hinder the firm's ability to attain financing from financial institutions. Due to a lack of assets suitable to serve as collateral, financial institutional may see themselves unable to extend credit. The impairment to borrow will

depress investments. Second, fire sales and other related disturbances may lead to increasing discrepancies between the market price and fundamental value of (financial) assets. These discrepancies are expected to distort the lending and investment decision making process of financial institutions, ultimately leading to the hoarding of cash.

In an attempt to better understand the interaction between the real economy and the financial sectors, Claessens et al. (2012) analyse business cycles and financial cycles. The scholars have found that the disruptions in credit, housing prices and equity prices shape the recessions. In general, recessions accompanied by one of the mentioned disruptions appear to be deeper and have a longer time span compared to recessions not accompanied by any of the disruptions. Of particular interest is the finding that recessions accompanied by busts in house prices or credit are more damaging in terms of output loss than recessions associated with an equity bust.[2] The idea that the type of boom-bust in domestic financial markets matters for the depth of a recession is relevant, also with respect to the subsequent recovery phase of the business cycle, as the depth of the preceding recessions is expected to be of importance for the subsequent recovery. Similar to Claessens, et al. (2012), Claessens, Dell'Ariccia, Igan and Leaven (2010) find evidence that initial domestic conditions prior to the recession have an impact on the depth, duration and average decline in output growth of a recession. Initial conditions that are found to be of impact are domestic asset price bubbles, growth in banking credit and the size of the current account deficit. Furthermore, the scholars have found domestic credit has an adverse impact on the level of financial stress in an economy. As a potential explanation for this finding, the scholars present the following line of reasoning. Households tend to hold a large share of their wealth in 'housing wealth', while wealth in equity is much more concentrated among individuals who are expected to make smaller consumption adjustments. Contrary to equity, housing assets do generally serve as collateral for a loan. As these loans can be used for the (temporary) adjustment of consumption patterns, a decrease in the value of the collateral is expected to have a large distortive impact on consumption patterns. Also, since equity prices are generally more volatile than house prices, a drop in house prices can be considered more permanent and therefore leads to a more permanent adjustment in consumption compared to a drop in equity prices.

Crowe, Dell'Arricia, Igan and Rabanal (2011) argue that the extent of the damage inherently associated with a boom and bust cycle in asset prices may actually depend on the type of capital driving the boom and bust cycle in these asset prices. When credit and leveraged institutions are involved, busts are thought to be more costly since the balance sheet of borrowers and lenders get a severe hit. When many financial intermediaries are involved, this could lead to a credit crunch with a severe impact for the real economy. Disruptions are argued to be less severe when the boom was primarily driven by equity market activity since balance sheet problems are considered to be less of a problem and the disruption of the credit channel is less severe. This is thought of as a plausible explanation for the fact that the bust of the dot-com bubble was relatively mild. By looking into the dynamics in real estate markets, the scholars find evidence in support of the arguments put forward. When an economy has experienced a simultaneous boom in both credit and the housing markets, a subsequent financial crises or severe loss in GDP was very likely. However, when a real estate boom was not accompanied by a boom in credit, the average subsequent recession was mild and a financial crisis was an exception.

2.3.4 Credit as the main link between savings and investments

As mentioned before, exogenous shocks have a persistent adverse effect on the relation between saving and investments in an economy,

[2] However, after controlling for country specific factors through the inclusion of fixed effect dummies to the regression, the dummy capturing recessions accompanied by a credit crunch is no longer statistically significant in determining the duration and depth of a recession.

ultimately relevant for the speed of subsequent economic recovery. In his subsection the role of credit, which is considered the most essential link between savings and investments (Claessens et al., 2012), is elaborated upon. Mendoza and Terrones (2008) identify some of the key empirical regularities associated with booms in credit for a sample of emerging and industrial economies. The scholars look for regularities at both the macro- and micro-level. With respect to the macro-level analysis, a systematic relationship exists between credit booms and economic expansions and rising asset prices. At the micro-level, credit booms are found to be closely associated with increases in the level of leverage used by firms, firm values and the use of external financing. Also, credit booms are periods with increased lending activity by banks. Simultaneously, credit booms are associated with a deterioration of banks' asset quality. As such, bank fragility appears to increase during credit booms. The findings by Mendoza and Terrones (2008) are related to the earlier discussed finding of Claessens et al. (2010), who find that domestic credit growth prior to a recession has adverse impact on the stress in an economy's financial system. Additionally, Mendoza and Terrones (2008) find that credit boom fluctuations at the micro- and macro-level are smaller in industrial economies than in emerging economies. While not all credit booms appear to end in financial crises, most financial crises in emerging markets were associated with credit booms. A last interesting finding is that the credit booms in emerging economies appear to be associated with large capital inflows. Jordà, Schularick and Taylor (2013) have found that credit is a key determinant in shaping the business cycle. In particular the scholars find that recessions accompanied by financial crises are more serve. Furthermore, the scholars find that when the expansion phase of the business cycle is credit-intensive, the subsequent recession is more severe and the likelihood of financial crisis increases.

2.3.5 Exogenous financial shocks: the type of capital inflow

As discussed in § 2.3.3, the type of boom-bust in domestic financial markets – i.e. credit markets, equity markets and real estate markets – is relevant for the depth of the associated recession. Since boom-busts in domestic financial markets have a persistent adverse effect on the equilibrium between savings and investments, the type of boom-bust is also of importance for the speed of the subsequent recovery. In this subsection, the capital inflows closely associated with these boom-busts in domestic financial markets are discussed, namely credit-driven and equity-driven capital inflows.

With increased dependence on foreign credit in economies with an open capital account may come increased vulnerabilities (Easterly, Islam and Stiglitz, 2000). Calvo, Leiderman and Reinhart (1994) argue that it is specifically important to consider the role of banks and other financial institutions that intermediate capital inflows. While the intermediation of capital inflows is not a necessity for these flows to reach the real economy - think of FDI - in practice banks often play a crucial role in intermediating capital inflows. Large increases in capital inflows to an economy may result in a relaxation of credit constraints due to the large amounts of funds available to bank. In this manner, fluctuations in capital flows can amplify movements in local financial markets and are often associated with financial crises (Claessens et al., 2010). As mentioned earlier, evidence is presented that suggests that the type of capital driving the boom and bust cycle in real estate prices is relevant for the adverse consequences the busts ultimately causes. Consistent with this evidence are the finding of Furceri, Guichard and Rusticelli (2012b), who find that capital inflow booms in FDI and equity have no significant effect on domestic credit, while debt-like capital inflows do have a large, positive effect on the level of domestic credit in an economy. This is important since, as discussed earlier, high domestic credit has been found to increase the risks of financial distress in an economy. Furceri, Guichard and Rusticelli

(2012a) research the effects of capital inflow booms on the likelihood of financial crisis. In general, the scholars find that capital inflow booms increase the likelihood of banking, currency and balance of payment crises. Of particular interest is the finding that distinguishing between the type of capital inflow appears to be relevant. Debt-driven booms in capital inflows significantly increase the likelihood of a financial crisis, whereas the effects of equity-driven and FDI-driven capital inflows are negligible.

2.3.6 The link between commodity prices and capital inflows

Especially in resource dependent economies, commodity prices are found to correlate with capital inflows. These fluctuations in commodity prices and associated capital inflows are found to be important sources of shocks in poorer commodity exporting economies (Masson, 2014).

A report by the World Bank (2006) shows that in developing economies commodity prices move procyclically with capital inflows in resource dependent economies: high commodity prices are associated with high capital inflows and low commodity prices with low capital inflows. During the expansionary phase of the business cycle aggregate demand and domestic borrowing increases. The increased creditworthiness of a country resulting from the booming commodity export revenues comes with an increased willingness of foreign investors to provide funds, resulting in increased capital inflows. As the business cycles in resource dependent economies are expected to be highly correlated with commodity export prices, and the credit market is procyclical by nature, the co-movement of commodity prices and capital inflows can significantly amplify the effect of a recession. Especially in developing economies in East Asia, Europe, Central Asia and Latin America, the correlation between worldwide commodity prices and private capital inflows is high.

Kinda, Mlachila and Ouedraogo (2016) present arguments that real exogenous shocks – sharp drops in commodity prices – can lead to fragility in the financial system of resource dependent economies. First, the exogenous shock leads to a decline in commodity export revenues for the resource dependent economy. This is expected to have an adverse impact on the ability of firms and the government to service their debt obligations. Second, commodity prices in resource dependent economies are often accompanied by an increase in the delinquency rates on bank loans. The result is that the balance sheets of banks weaken. The changed fundamentals - expected commodity export revenues have changed - can result in increased withdrawals because local agents prefer cash or because foreign investors reallocate their (short-term) funds abroad. Third, the lower commodity export revenues can have an adverse impact on the fiscal budget, forcing the government to adjust its spending pattern, in turn adversely affecting the ability of firms and individuals to pay their debt. This is in line with Swaray (2005) who has found that sharp fluctuations in commodity prices are partly responsible for debt problems in resource dependent lower developed economies.

The tendency of commodity prices and capital inflows to be highly correlated has led Reinhart et al. (2016) to introduce the concept of the double bust, referring to the simultaneous bust in commodity prices and capital inflows. The scholars find that sovereign defaults are especially likely after a double bust in capital inflows and commodity markets.

2.4 Economic recovery

In the aforementioned has been elaborated on the mechanisms that channel exogenous shocks ultimately affecting real economic activity, whereby consideration was given to the interlinkage between the financial sectors and real sectors. This discussion was relevant, because shocks have an adverse effect on real economic activity that persists over time and, hence, also affect real economic activity in the recovery phase of the business cycle. The primary focus of the following subsection is one this phase of economic recovery.

Scholars have found various factors that contribute to speedy recovery from recessions.

General factors that are found to boost recovery from recessions are a depreciation of the real exchange rate, government stability, the quality of institutions, fiscal policy and increased foreign aid (Funke et al., 2008; Cerra et al., 2013).

The goal of this research is not to identify factors that contribute to speedy recovery from a recession, but rather to identify if the circumstances that accompanied the recession that preceded the recovery affect the speediness of subsequent economic recovery. In this subsection (i) some theoretical explanations for the existence of a growth 'bounce back'-effect after a recessionary period are discussed and (ii) the empirical evidence for the existence of such a bounce back-effect.

In the classic conception of the business cycle, the business cycle is depicted as a temporary deviation from a stationary trend (Cerra et al., 2013). If the business cycle is conceptualised as temporary deviation from a stationary trend, this would imply that the initial decline in output during a recession will be offset during the subsequent recovery. Cerra and Saxena (2007) discuss some theoretical explanations for the existence of such a 'bounce back'-effect. First, adverse shocks to an economy may urge governments to implement political and economic reforms. If these reforms include corrective policies that reduce pre-shock inefficiencies, one might expect a spur in growth rate, offsetting the initial drop in output. Another argument builds on Schumpeter's idea of creative destruction (Schumpeter, 1942). The recession in the aftermath of an adverse shock leads to bankruptcies among inefficient firms. If the remaining firms and the new entrants are able to produce at higher productivity levels, the increased average productivity in an economy may offset the initial decline in output. Also, the scholars put forward that a temporary drop below average capacity utilisation is offset by a strong capacity utilisation during the recovery phase. However, when the initial decline in output is not offset in the recovery phase - for example because productivity is only restored to or below its pre-recession level - a gap would remain between pre-shock output forecasts and actual output.

In the empirical literature, mixed evidence is found on the existence of a bounce back-effect in terms of economic growth after a recessionary phase. Kim, Morley and Piger (2005) find evidence for a strong post-recession bounce back-effect in US output data. However, the scholars are unable to confirm a similar strong bounce back-effect in the output data of other economies. The appearance of a cross-country difference in terms of the existence of a bounce back-effect is in line with Cogley (1990), who argues that recovery is different from country to country as countries have very different stochastic output structures.

Scholars have challenged the existence of a bounce back-effect. Cerra and Saxena (2008) find that output loss during a contraction phase is generally not restored in the long-run recovery phase, while Cerra et al. (2013) find no evidence for the existence of a bounce back-effect in the first year and the first two years of economic recovery after a recession.

Calvo, Izquierdo and Talvi (2006) research recoveries from output collapses that were preceded by extreme drops in capital inflows. The scholars find recoveries from these so-called 'sudden stops' to be speedy, while occurring without an associated increase in credit and capital inflows, and only very weak increase in investments. Even though these economies appear to recover quickly without an associated increase in credit, the scholars stress that the long-run consequences, such as a meltdown of the domestic banking system, are expected to be severe. With respect to recoveries in the aftermath of a financial crisis, Reinhart and Rogoff (2014) find that these recoveries are slow. Opposed to these findings, Bordo and Haubrich (2010) find evidence in US output data for rapid recoveries in the aftermath of a recession accompanied by financial crises. The scholars attribute the speedy recovery to the considerable depth of the preceding recession.

Abiad, Dell'Ariccia and Li (2011) find that creditless recoveries - recoveries without an associated increase in credit growth - are a common phenomenon. Twenty percent of the recoveries are creditless and the average growth rate during these recoveries is about one-third

lower than normal recoveries. In addition, the scholars observe that creditless recoveries are likely to be preceded by events that have an expected disruptive impact on the supply of credit in an economy, such as banking crises, credit boom-busts and real estate boom-busts. The creditless recoveries appear to be a consequence of impaired financial intermediation. Thus, low growth during creditless recoveries can be explained by the constrained allocation of resources. This is consistent with the earlier mentioned findings by Furceri et al. (2012a) who show that economies that go through a boom-bust in capital inflows are more likely to subsequently suffer from currency crises, banking crises or balance of payments crises. Also in line with the findings of Abiad et al. (2011) are the findings of Claessens et al. (2012) who find that credit growth has a significant effect on the shape of economic recovery. Finally, Jordà et al. (2013) find that excess credit during the expansion phase is associated with low growth during the recovery from recession. This effect is stronger when the recession is accompanied by financial crises. Furthermore, the scholars find a large downward deviation in the level of investments during the recovery in the event the recession was associated with a financial crises.

2.5 Introducing the hypotheses

The core line of reasoning that has been the guiding principle in the theoretical framework, is that real exogenous and financial exogenous shocks – i.e. fluctuations in commodity prices and capital inflows – affect real economic activity through numerous transmittance channels, whereby these shocks have an adverse and persistent effect on the link between savings and investments. Put differently, it takes time for the equilibrium between investments and savings to be restored, hindering the optimal allocation of resources during the recovery phase after a recession that was accompanied by an exogenous shock. Therefore, it is argued in this research that recessions accompanied by a real or financial shock are associated with slower subsequent recoveries relative to recoveries not preceded by these respective shocks. This results in the following main hypothesis:

> ***H1:*** *Recoveries from recessions accompanied by an exogenous shock are slower than recoveries without these respective shocks.*

The basic hypothesis has been subdivided in the following subhypotheses:

> ***H1 (a)*** *– Recoveries from recessions accompanied by an exogenous real shock are slower than recoveries without these respective shocks.*
>
> ***H1 (b) –*** *Recoveries from recessions accompanied by an exogenous financial shock are slower than recoveries without these respective shocks.*

Two additional hypotheses have been formulated. The first additional hypothesis and second additional hypothesis are independent of each other and both build on the main hypothesis.

A thematic division has been made for the two additional hypotheses. The theme of the first additional hypothesis is resource dependence, whereby the effect of resource dependence on the speed of economic recovery is investigated. The scope of the first additional hypothesis is only on commodity price-related exogenous shocks and double busts. This results in the first additional hypothesis:

> ***H2*** *– Recoveries from recessions accompanied by commodity price-related exogenous shocks are slower in resource dependent economies than in non-resource dependent economies.*

For the purpose of testability, the first hypothesis is subdivided in the following independent subhypotheses:

> ***H2 (a)*** *- Recoveries from recessions accompanied by a boom-bust in commodity prices are slower in resource dependent economies than in non-resource dependent economies.*
>
> ***H2 (b) –*** *Recoveries from recessions accompanied by a double bust are*

slower in resource dependent economies than in non-resource dependent economies.

The scope of the second additional hypothesis, is only on exogenous financial shocks. Hence, for the second additional hypothesis, an economy's dependence on the export of natural resources is considered irrelevant.

As aforementioned, capital inflows do not affect the real economy directly, but rather indirectly through domestic financial markets, whereby boom-busts in domestic credit markets are transmitted differently from those in domestic equity markets. Hence, it makes sense to also make this distinction at the capital inflow level, as distinctive capital inflows drive the boom-busts in distinctive domestic markets. This results in the second additional hypothesis:

H3 *- Recoveries from recessions accompanied by a boom-bust in debt-like capital inflows are slower than recoveries from recessions accompanied by a boom-bust in equity-like capital inflows.*

3 DATA AND METHODOLOGY

In this section the data and methodology employed in this research are described. First a description of the data is presented (§ 3.1) followed by the methodology (§ 3.2). Subsequently, some summary statistics are presented, together with a few illustrative graphs of what are considered exogenous shocks for the purpose of this research (§ 3.3).

3.1 Description of the variables

For the purpose of this research, an unbalanced panel dataset containing yearly observations was built. The final dataset includes 130 OECD and developing economies over the period 1980-2015. As countries with a small population size are found to be relatively volatile, it is common in the academic literature to drop these countries from the dataset (e.g. Cerra et al., 2013). Therefore, the dataset does not contain countries with a population size less than 1 million in the year 2005.

In this subsection the variables used in this research are described. A detailed description of the data and the (original) source of the data, can be found in Appendix A.

Per capita GDP growth. Real GDP per capita is used as the dependent variable. A performance measure that is normalised by population is used, because population growth has varied considerably over time and cross country population growth variation is still present today.

Commodity export data. As it is common in the empirical literature on resource dependence to use commodity exports relative to some measure of total exports (Hailu and Kipgen, 2017), a country's commodity exports as a percentage of total merchandise exports is used as a proxy for resource dependence.

Furthermore, it is common in the empirical literature to distinct between (1) point-source natural resources referring to resources extracted from a specific, narrow geographic base like hydrocarbons, metals and minerals and (2) other natural resources referring to resources such as crops and pasture land that are not necessarily bound to a specific geographic base and can be put to productive use at a location of choice (Brunnschweiler and Bulte, 2008). This distinction is also considered in the present research.

As measures for point-source natural resources a measure of the export dependence on (i) energy related commodities and (ii) metal and ores related commodities are used. In the category other natural resources, a measure of a country's export dependence on raw agricultural goods is used. All these export dependence measures are retrieved from the World Development Indicators of the World Bank and are expressed relative to an economy's total merchandise exports. The data is collected under the variable names *Fuel*, *Metal* and *Agri*.

Commodity prices. As proxies for the world wide commodity prices in the different commodity classes the World Bank Commodity Price Data is used. From this database the indices in the series energy prices, metal and ores prices, and agricultural goods prices are retrieved. All indices are in real terms and have 2010 as base level. The variable *EnergyPrice* is the price index of hydrocarbons capturing the annual, average prices of coal, crude and gas over a year. *MetalPrice* is a proxy for the annual, average prices of metals and minerals and *AgriPrice* is a proxy for the annual, average prices of raw material agricultural goods. Since all the indices are based on worldwide commodity prices, there is no cross country difference in these variables.

Proxies for capital flows. All capital flow measures collected for the construction of the final dataset are extracted from the Alfaro et al. (2014) dataset. All the capital inflow measures are expressed as a percentage, relative to a country's GDP.

Both net capital inflow data and gross capital inflow data is collected, as scholars have argued that the use of net measures of capital inflow is not always appropriate; net measures reflect a variety of offsetting plusses and minuses. Therefore, the net capital inflow position can hide the economy's dependence on gross inflows (Johnson, 2009). Since the holders of foreign assets are not necessarily identical to the

ones incurring foreign liabilities, netting gross inflows and gross outflows is argued to not allow for the appropriate differentiation in the behaviour of domestic investors and foreign investors (Forbes and Warnock, 2012).

Scholars often use the current account balance with a negative sign - capturing the difference between domestic savings and domestic investments - as a proxy for capital inflows. This raw net measure of total capital inflows is one of the measures used in this research. Another measure of total capital inflow collected is total gross capital inflows. With respect to debt- and equity-like capital inflows both net and gross measures of (i) total debt inflow, (ii) total portfolio equity inflow and (iii) total FDI inflow are collected. An additional net debt-like capital inflow measure collected guaranteed and non-guaranteed bank flows.[3]

Financial crisis. Data on the timing of systematic banking crises, currency crises and sovereign debt crises from Laeven and Valancia (2008; 2012) is used as a control variable in this research. From this data a dummy variable that takes the value of 1 if a country is experiencing a specific type of financial crisis and 0 otherwise is constructed. Unfortunately, the data covers the period 1970 - 2012. For the last three years the assumption is made that no financial crises occurred. Although quite a rough assumption, leaving these values missing would result in a substantial loss of observations in the conducted regression analysis.

Identifiers. Furthermore, identifiers *RICHOECD* and *RAWDEVSMPL* are collected from the Alfaro et al. (2014) dataset, identifying whether a country is, respectively, a developed economy or a developing economy.

3.2 Methodology

In this subsection a description is presented of how the dummies that proxy for recoveries from recessions that either were or where not accompanied by exogenous shocks are programmed (§ 3.2.1). Second, the fixed effects model employed for testing the hypotheses is presented (§ 3.2.2). Lastly, the hypothesis testing procedure is elaborated upon (§ 3.2.3).

3.2.1 Programming Recovery, BoomBustRecovery and DoubleBustRecovery

Important for the purpose of this research is programming the different dummy variables capturing recoveries from recessions that either were or were not accompanied by an exogenous shock. In general, recoveries from recessions not accompanied by a boom-bust in one of the variables of interest, are referred to as *Recovery*. Recoveries from recessions that are accompanied by a boom-bust in either commodity prices or capital inflows are referred to as *BoomBustRecovery*. Recoveries from recessions accompanied by a simultaneous bust in commodity prices and capital inflows as *DoubleBustRecovery*. For the purpose of replicability, an extensive elaboration on data handling and the programming of *BoomBustRecovery* and *DoubleBustRecovery* is presented in Appendix 2.[4]

Recovery. Inspired by the work of Cerra et al. (2013), *Recovery* is defined as the first year of economic expansion - positive growth - after a spell of observations with negative growth. Spells of negative growth are considered to be recessions.

BoomBustRecovery* and *DoubleBustRecovery. Before *BoomBustRecovery* and *DoubleBustRecovery* can be programmed, the boom-bust cycles and double busts need to be identified in the various commodity price measures and capital inflow measures.

Peaks and troughs. As a first step the peaks and troughs in the time series of the relevant variables are identified. For this task the algorithm developed in Bry and Boschan (1971) is used. It is common in the empirical literature to use this algorithm for the identification of turning points in the univariate

[3] The measure guaranteed and non-guaranteed bank flows is only available on net basis.

[4] With respect to the third hypothesis, the used terminology is slightly different. The reason for the deviating use of terminology is explained in §3.3.

time series (Claessens et al., 2012; Reinhart et al., 2016).[5]

The Bry and Boschan (1971) algorithm allows for the specification of the following parameters. First, the *Window*-parameter is to be set. The *Window*-parameter determines the number of observations to be used on each side of the extrema for the computation of the local minima and maxima. In the present research, the standard Window-parameter of one is used. Formally, a peak and trough, respectively, occur when the following conditions are satisfied:

$$\{[(Y_t - Y_{t-1}) > 0] \; and \; [(Y_t - Y_{t+1}) < 0]\}$$
(Peak)

$$\{(Y_t - Y_{t-1}) < 0] \; and \; [(Y_t - Y_{t+1}) > 0]\}$$
(Trough)

Besides the *Window*-parameter, the algorithm also requires the minimum phase and cycle length to be specified. For yearly data, Harding and Pagan (2016) argue it makes sense to minimally specify the *Phase*-parameter to one year and the *Cycle*-parameter to two years. Similar to Bartoletto, Chiarini, Marzano and Piselli (2015) the parameters are set in this manner.

Boom-bust cycles and double busts. After the peaks and troughs are identified, the next step is to calculate the amplitudes of the booms and busts. For this purpose boom (bust) dummy is generated that is assigned the value of 1 at the trough (peak), the value of 0 between trough and peak (peak and trough) and is undefined in all other periods. For the boom (bust) phase, a spell identifier is specified to recognise 1 as the start of a boom (bust) and 0 as the remainder of the boom (bust) phase. The missing values - which are booms for the bust dummy and busts for the boom dummy - are specified to be ignored. With the identification of all the boom and bust phases in the data, it is possible to calculate the amplitude in absolute terms as the difference between the last observation and the first observation. Once absolute change is calculated one can easily compute this to percentage change given that the beginning and end of the cycle are known.

For the identification of the double busts, the data on the bust phases of the cycles identified in the commodity price and capital inflow variables are used. The definition of the double bust in this research builds on the work of Reinhart et al. (2016). According to their definition, a double bust requires an overlap in the bust phase of the commodity price measure and capital inflow measure of at least two years. For a more detailed description of the manner in which the double bust dummies are programmed, reference is made to Appendix B.

The event dummies should capture recoveries from recessions accompanied by different boom-busts or double busts. While a boom phase always ends before a bust phase starts, the bust phase has not always ended before economic recovery starts.[6] With respect to calculating the amplitude of the bust, percentage change from the start of the bust - the peak - until the start of economic recovery is calculated. Of course, when the bust phase is not 'cut-off' by the start of recovery, the amplitude is calculated from peak to trough. The amplitude condition is set above a certain threshold value to specify the magnitude of the shocks.

The magnitude of the shock. Booms (busts) with an amplitude above (below) the median of the sample are considered booms (busts) that exceed the threshold value. Regarding the threshold for the booms and busts in commodity prices, no distinction is made between developing economies and developed economies, as they are all calculated using identical time series. In the base setting, all booms that are above the 50^{th} percentile of the positive shocks are considered booms. All busts that are below the 50^{th} percentile of the negative shocks are considered busts. If a bust is followed by a boom, the condition for the boom-bust is satisfied.

With respect to the financial shocks a slightly different approach is used, as cross-country

[5] Stata's *SBBQ*-module is used as an implementation of the algorithm.

[6] Business cycles are expected to be correlated with boom-busts in commodity prices and capital inflows, but the cycles do not necessarily coincide.

capital inflow volatility differences need to be taken into account. Making no distinction between developing economies and developed economies would be inappropriate. Hence, similar to Claessens et al. (2012) a distinction is made between developing economies and developed economies. This is done with the identifiers *RICHOECD* and *RAWDEVSMPL*. After the grouping procedure, the booms, the busts and the boom-busts are qualified in the same manner as with the commodity price measures.

The definition of the double bust – an overlap in the bust phase in two variables – is rather restrictive. In order to generate enough recovery dummies to allow for statistical analysis, all negative shocks below the 75th percentile in both commodity prices and capital inflows, are considered busts.

Linking the boom-busts and double busts to recovery. With respect to recoveries from recessions accompanied by boom-busts in the variables of interest, *BoomBustRecovery* is assigned the value of 1 if the amplitude threshold for both the boom and bust phase is exceeded when economic recovery starts. The same holds for a recovery that starts one year after a boom-bust cycle fulfilling the set amplitude condition has ended. Double busts are linked to recovery in a similar manner. Of course, the boom phase is not taken into account for the double busts.

A last step is to redefine the different recovery dummies to get separate groups that are mutually exhaustive and collectively exclusive. This comes down to restricting *Recovery* to take the value of 1 if *BoomBustRecovery* takes the value of 1 and restricting *Recovery* to take the value of 1 if *DoubleBustRecovery* takes the value of 1.

3.2.2 Model specifications

As the dataset used in this research has both cross-sectional and time series elements, panel data techniques are used to capture both effects. With pooled OLS estimation techniques a linear regression would be fitted to the full dataset and the fact that observations are grouped by country would be ignored. This is expected to result in inconsistent estimates as cross country intercepts and coefficients are assumed to be identical, thus running the risk of unobserved heterogeneity. The use of panel data techniques allows for the resemblance of the true multivariate regression line (Wooldridge, 2013). With respect to panel data techniques one can consider a random effects model and a fixed effects model. In a random effects model strict exogeneity of unobserved country-specific features with the regressors in the model is assumed. As the regressors in the model are *Recovery* and different configurations of *BoomBustRecovery*, the assumption of zero correlation with the unobserved heterogeneity in the model and the recovery dummies is unlikely to hold. For example, since the countries in the dataset are in different stages of development, some countries are more vulnerable to boom and bust cycles in commodity prices or capital inflows. Therefore, these countries are more likely to experience recoveries that were preceded by recessions accompanied by a boom and bust cycle. In such cases, random effect estimation can be considered an incorrect estimation technique (Wooldridge, 2013). Fixed effects estimations also helps to remove the problem of unobserved heterogeneity as the unobserved time-invariant country specific features are removed from the regression. For an illustration of the general intuitive technique behind fixed effects estimations reference is made to Appendix 3.

The following fixed effects model, inspired by Cerra et al. (2013), is used as a starting point in the present research:

i) $$Growth_{c,t} = \beta_1 Recovery_{c,t} + \theta_c + \theta_t + \varepsilon_{c,t}$$

By definition recovery years are expansion years. Hence, it makes sense to compare recovery years to other expansion years. Therefore contraction years are excluded from the dataset. Hence, $Growth_{c,t}$ captures the positive growth years in GDP per capita for country *i* at time *t*. Because the dependent variable only consists of positive growth years and *Recovery* takes the values of 1 in the first year of economic recovery, β_1 captures the speed of economic recovery in the first year

after a recessionary period relative to other expansion years. The vectors θ_c and θ_t represent, respectively, the country fixed effects and time fixed effects. $\varepsilon_{c,t}$ represents the idiosyncratic error term.

Main hypothesis. After running several tests on the specification of Cerra et al. (2013), an extension is made to their model in order to test the main hypothesis of this research. For the programmed real and financial shocks this leads to:

ii) $$Growth_{c,t} = \beta_1 Recovery_{c,t} + \beta_2 BoomBustRecovery_{c,t} + \theta_c + \theta_t + \varepsilon_{c,t}$$

Similarly, for the simultaneous busts in a real variable and a financial variable (double busts) this leads to:

iii) $$Growth_{c,t} = \beta_1 Recovery_{c,t} + \beta_2 DoubleBustRecovery_{c,t} + \theta_c + \theta_t + \varepsilon_{c,t}$$

With respect to equation ii) and iii), β_1 captures the speed of the first year of economic recovery after a recession relative to all other expansion years, since *Recovery* takes the value of 1 in the first year of economic recovery after a recession. *BoomBustRecovery* in equation ii) takes the value of 1 in the first year of economic recovery after a recession accompanied by a boom-bust in one of the commodity prices or capital inflow variables. Hence, β_2 in equation ii) captures the speed of first year recoveries from recessions accompanied by boom-busts in a real or financial variable. *DoubleBustRecovery* in equation iii) takes the value of 1 in the first year of economic recovery after recessions accompanied by a simultaneous bust in one of the commodity price variables and a measure of total capital inflow (double bust). Hence, β_2 in equation iii) captures the speed of the first year of economic recovery from a recessions accompanied by a double bust. Remember that both *Recovery* and *BoomBustRecovery* and *Recovery* and *DoubleBustRecovery* are programmed in such a manner that they are mutually exhaustive and collectively exclusive.

Second hypothesis. As the first hypothesis is, for the purpose of testability, subdivided in two distinct sub hypotheses, the two equations used to them are also presented separately. The model used to test H1 (a) and H1 (b) is represented by the following equations:

iv) $$Growth_{c,t} = \beta_1 Recovery_{c,t} + \beta_2 BoomBustRecovery_{c,t} + \beta_3 BoomBustRecovery * CommodityDependence + \beta_4 CommodityDependence + \theta_c + \theta_t + \varepsilon_{c,t}$$

v) $$Growth_{c,t} = \beta_1 Recovery_{c,t} + \beta_2 DoubleBustRecovery_{c,t} + \beta_3 DoubleBustRecovery * CommodityDependence + \beta_4 CommodityDependence + \theta_c + \theta_t + \varepsilon_{c,t}$$

β_1 captures the speed of the first year of economic recovery after a recession relative to all other expansion years as *Recovery* takes the value 1 in the first year of economic recovery after a recession. *BoomBustRecovery* in equation ii) takes the value of 1 in the first year of economic recovery after a recessions accompanied by a boom-busts in either energy prices, metal and ores prices or agricultural prices. Hence, β_2 captures the speed of first year recoveries from recessions accompanied by boom-busts in either energy prices, metal and ores prices or the prices in agricultural goods. *DoubleBustRecovery* and β_2 in equation (iii) work in a similar fashion with the notable difference that *DoubleBustRecovery* takes the value of 1 in the first year of economic recovery from recessions accompanied by simultaneous busts in both (i) energy prices, metal and ores prices or the prices of agricultural goods and (ii) total capital inflows.

Confirmation of H1 (a) and H1 (b) would mean that growth in the first year of economic recoveries from recessions accompanied by boom-busts in commodity prices or double bust is slower in resource dependent economies relative to non-resource dependent economies. The asymmetry in the speed of economic recovery between resource dependent and non-

resource dependent economies is captured by β_3. *BoomBustRecovery*CommodityDependence* ≥ 1 if the country is dependent on the exports of energy, metal and or agricultural goods while also in the first year of economic recovery from a recession accompanied by a boom-bust in energy prices, metal and ores prices or agricultural prices. Similarly, *DoubleBustRecovery*CommodityDependence* represents the interaction between the dummy capturing recoveries from recessions accompanied by simultaneous busts in commodity prices and capital inflows, and the commodity dependence measures. β_4 in equation ii) and iii) is included as a control variable, capturing the effect of resource dependence on economic expansion.

Third hypothesis. With respect to the third hypothesis it should be assessed whether recoveries from recessions accompanied by boom-busts in debt-like capital inflows are slower than recoveries from recessions accompanied by boom-busts in equity-like capital inflows. For the purpose of testing the third hypothesis, the following equation is used:

vi) $$Growth_{c,t} = \beta_1 EquityBoomBustRecovery_{c,t} + \beta_2 DebtBoomBustRecovery_{c,t} + \theta_c + \theta_t + \varepsilon_{c,t}$$

β_1 captures recoveries from recessions accompanied by boom-busts in equity-like capital inflows, while β_2 captures recoveries from recessions accompanied by boom-busts in debt-like capital inflows. As discussed, *Recovery* and *BoomBustRecovery* are defined as separate groups that are mutually exhaustive and collectively exclusive. This is not the case for *EquityBoomBustRecovery* and *DebtBoomBustRecovery.*

3.2.3 Hypotheses testing procedure

Equation ii) and iii) are used to test the main hypothesis. The coefficients of interest are β_1 and β_2. Confirmation of the main hypothesis would mean that the estimated beta coefficient of *BoomBustRecovery* (β_2) is statistically significantly lower than the estimated beta coefficient for the normal recovery dummy (β_1). Hence, it is to be assessed whether β_2 is statistically significantly lower than β_1. For the purpose of testing whether β_2 is statistically significantly smaller than β_1, a one-sided Wald-test is performed.

With respect to the second hypothesis, the primary interest is with β_3 of equation iv) and v). In order to confirm the second hypothesis, the estimated coefficient for *BoomBustRecovery*CommodityDependence* and *DoubleBustRecovery*CommodityDependence* - (β_3) - needs to be statistically significantly smaller than 0, as this would indicate that recoveries after boom-busts in commodity prices or after double busts are significantly slower in resource dependent economies compared to non-resource dependent economies. This is also done by performing an one-sided Wald-test.

For the third hypothesis, the beta coefficients of interest are estimated using equation vi). In order to confirm the third hypothesis, the estimated beta coefficient for *DebtBoomBustRecovery* should be statistically significantly lower than the estimated beta coefficient for *EquityBoomBustRecovery*. Hence, for confirmation of the third hypothesis, β_2 should be statistically significantly lower than β_1, which is assessed by performing a one-sided Wald-test.

Hence, the following one-sided Wald-tests are performed in order to test the different hypotheses of the present research. For the main and third hypothesis, an one-sided Wald-test in the form $\beta_3 = 0$ is performed. With respect to the second hypothesis, a one-sided Wald-test in the form $\beta_2 - \beta_1 = 0$ is performed.[7]

7 When performing the Wald-test as mentioned, Stata calculates a two-sided p-value and an F-statistic. As directional hypotheses are formulated, the interest is with one-sided p-values. Because the maximum number of estimated coefficients to be tested simultaneously is two, one can use the property that the Wald F-statistic only has 1 numerator degree of freedom, which means that the square root of the F-statistic is the absolute value of the t statistic for the one-sided test. By multiplying the square root of the F-statistic with the hypothesised direction – the interest is in the left tail – a value is calculated that can be fitted in a normal distribution, giving the calculated probability that the observed results are found when the null hypothesis is true (MacDonald, K. One sided tests for coefficients, retrieved from

3.3 Summary statistics

In this subsection, some correlation statistics (§ 3.3.1), illustrative graphs of *BoomBust-Recovery* and *DoubleBustRecovery* (§ 3.3.2) are presented. Furthermore, an overview of the various configurations of the recovery dummies is presented.

3.3.1 Correlations: commodity prices, capital inflows and resource dependence

In Table 1 and Table 2 correlations are presented between prices in different commodity classes and (the lags of) capital inflow. The capital inflow measure used in Table 1 is the net total capital inflow measure and the capital inflow measure used in Table 2 is the gross total capital inflow measure.

Net capital inflows				
Energy dependence				
	t=0	t+1	t+2	t+3
Full sample	-0,0293	-0,0042	0,0148	0,0145
Non-resource dependent	0,1147	0,0907	0,0853	0,0701
Resource dependent	-0,1253	-0,0655	-0,0292	-0,0199
Metal and ores dependence				
	t=0	t+1	t+2	t+3
Full sample	-0,0377	0,0013	0,0281	0,0364
Non-resource dependent	-0,134	-0,0909	-0,0421	-0,0086
Resource dependent	0,0763	0,1137	0,1151	0,0921
Agricultural goods dependence				
	t=0	t+1	t+2	t+3
Full sample	0,0418	0,0624	0,0628	0,0519
Non-resource dependent	0,0126	0,042	0,0478	0,043
Resource dependent	0,0813	0,0895	0,0838	0,0627

Table 1 – Correlation between prices in different commodity classes and (the lags of) net total capital inflows.

Gross capital inflows				
Energy dependence				
	t=0	t+1	t+2	t+3
Full sample	0,0314	0,0716	0,0628	0,0207
Non-resource dependent	0,0155	0,0655	0,0373	0,0000
Resource dependent	0,0522	0,0772	0,0907	0,0464
Metal and ores dependence				
	t=0	t+1	t+2	t+3
Full sample	0,0511	0,0303	0,0089	-0,0054
Non-resource dependent	0,0401	0,0351	0,0148	-0,0036
Resource dependent	0,0547	0,0226	0,0033	-0,007
Agricultural goods dependence				
	t=0	t+1	t+2	t+3
Full sample	-0,0354	-0,0149	-0,0338	-0,0856
Non-resource dependent	-0,0629	-0,0409	-0,0579	-0,1074
Resource dependent	0,0009	0,0178	-0,0029	-0,0572

Table 2 – Correlations between prices in different commodity classes and (the lags of) gross total capital inflows.

Table 1 presents a rather mixed picture with respect to the correlations between commodity prices and capital inflows in resource and non-resource dependent economies. For example, as expected, the correlation between metal and ores prices and (the lags in) gross capital inflows is higher in economies that are dependent (above the 50th percentile) on the export of metal and ores relative to the total sample. However, with respect to energy dependent economies, the correlations are not as expected.

With respect to gross measure of capital inflows, Table 2 clearly shows the expected higher correlation between commodity prices and (the lags in) capital inflows in resource dependent economies relative to non-resource dependent economies.

3.3.2 Illustrative graphs of exogenous shocks

In graph 1 a graphical illustration of *BoomBustRecovery* that is programmed using a gross measure of FDI inflow is presented. In graph 2 a graphical illustration of *DoubleBustRecovery* is presented, which is programmed using the measure for energy prices and gross total capital inflows.

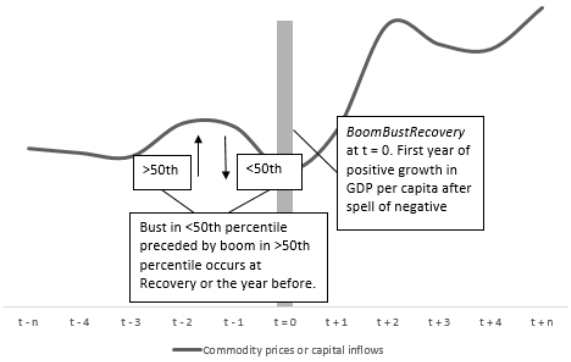

Figure 1 - Ilustration of *BoomBustRecovery*.

https://www.stata.com/support/faqs/statistics/one-sided-tests-for-coefficients/).

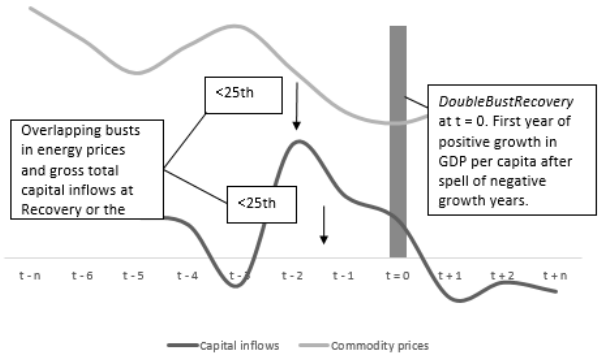

Figure 2 - Ilustration of *DoubleBustRecovery*.

3.3.3 Overview of recovery dummies

In Table 1 an overview of the various configurations of *BoomBustRecovery* and *DoubleBustRecovery* programmed for this research. Number 1 in table 1 says "*BoomBustRecovery/Recovery* | Energy prices" and after it "172/370" This means that *BoomBustRecovery* is defined relative to *Recovery*. *BoomBustRecovery* is programmed as a recovery from a recession accompanied by a boom-bust in energy prices. In this configuration 172 *BoomBustRecovery* and 370 *Recovery* are found.

To prevent confusion, additional explanation is given for number (16) – (21) in Table 1. Number (16) says "*EquityBoomBust-Recovery/DebtBoomBustRecovery* | Gross total port. equity capital inflows/gross total debt inflows" and after it "69/179". The different terminology is chosen because when testing the third hypothesis, *BoomBustRecovery* is not defined relative to *Recovery*, but to another configuration of *BoomBustRecovery*. Hence, *EquityBoomBustRecovery* is actually just *BoomBustRecovery* (capturing the first year of economic recovery from a recession accompanied by a boom-bust in equity-like capital inflows), but given a different name tag, because it is defined relative to another configuration of *BoomBustRecovery (*capturing the first year of economic recovery from a recession accompanied by a boom-bust debt-like capital inflows). In this configuration 69 *EquityBoomBustRecovery* and 179 *DebtBoom-BustRecovery* are found.

As aforementioned, *Recovery* and *BoomBust-Recovery* are programmed as separate groups that are mutually exhaustive and collectively exclusive. This is not the case for *EquityBoomBustRecovery* and *DebtBoomBust-Recovery.*

BBR, *DBR*, *EBBR* or *DBBR* relative to R* and its underlying variable(s).	No. of resp. dummies.
(1) *BBR/R* - Energy prices.	172/370
(2) *BBR/R* - Metal & mineral prices.	149/393
(3) *BBR/R* - Raw material agricultural goods prices.	151/391
(4) *DBR/R* - Energy prices + total gross inflows.	85/477
(5) *DBR/R* - Metal & mineral prices + total gross inflows.	73/490
(6) *DBR/R* - Raw material agricultural goods prices + total gross.	126/435
(7) *BBR/R* - Net total capital inflows.	194/338
(8) *BBR/R* - Gross total capital inflows.	180/324
(9) BBR/R - Gross total debt inflows.	179/383
(10) *BBR/R* - Gross total port. equity capital inflows.	168/334
(11) *BBR/R* - Gross total FDI capital inflows.	69/199
(12) *BBR/R* - Net total debt inflows.	188/316
(13) *BBR/R* - Net total port. equity capital inflows.	98/210
(14) *BR/R* - Net total FDI capital inflows.	169/333
(15) *BBR/R* - Net total gtd and non-gtd bank flows.	104/221
(16) *EBBR/DBBR* - Gross total port. equity capital inflows/gross total debt inflows.	69/179
(17) *EBBR/DBBR* - Gross FDI capital inflows/gross total debt inflows.	168/179
(18) *EBBR/DBBR* - Net total port. equity capital inflows/net total debt inflows.	98/137
(19) *EBBR/DBBR* - Net total FDI capital inflows/net total debt inflows	169/188
(20) *EBBR/DBBR* - Net total port. equity capital inflows/net total gtd. and non-gtd bank flows.	98/104
(21) *EBBR/DBBR* - Net total FDI capital inflows/net total debt inflows.	169/104

** BBR = BoomBustRecovery, DBR = DoubleBustRecovery, EBBR = Equity-BoomBustRecovery, DBBR = DebtBoomBustRecovery and R=Recovery.*

Table 3 - Overview various configurations of recovery dummies and the number of respective recovery dummies.

4 EMPIRICAL RESULTS

In this section the empirical results are presented. The reporting of the results is structured as follows. First, the results from running the specification of Cerra et al. (2013) are presented and some general tests on this specification are performed (§ 4.1). As the second hypothesis builds on the main hypothesis for the commodity-price related exogenous shocks, and the third hypothesis builds on the main hypothesis for the financial exogenous shocks, the structure used for the presentation of the results is as follows. In § 4.2 the main hypothesis and the second hypothesis are tested for commodity-price related exogenous shocks. Next, in § 4.3, the main hypothesis and the third hypothesis are tested for the financial exogenous shocks.

4.1 Testing the specification of Cerra, Panizza and Saxena (2013)

Before testing the hypotheses, the regression on the specification of Cerra et al. (2013) is performed, as represented in equation i). The regression results are presented in Table 3.[8]

The results are in line with the results of Cerra et al. (2013). The first year of economic recovery from a recession is slower than other expansion years, with β_1 between -0.462 and -0.463 at the 1%-significance level. The results do not provide evidence that a bounce back-effect exists in the first year of economic expansion after a recessionary phase.

Cerra et al., (2013) argue that the slower growth in the first year of economic expansion after a recession may relate to the fact that the first year may also include(s) one (or more) quarter(s) of economic contraction. However, this effect is expected to be balanced out by cases in which the last year of economic contraction include(s) one (or more) quarter(s) of economic expansion. In the case that these effects do not balance out, there is no a priori reason to suspect that the potential bias in the different configurations of *Recovery* and *BoomBustRecovery* is a concern for the hypotheses to be tested in this research. The potential bias will exist for all the configurations of the recovery and event recovery dummies and I see no reason to assume that persistence of growth related issues are different depending on the configuration of *Recovery*, *BoomBustRecovery* or *Double-BustRecovery*.

Table 3 - Specification Cerra, Panizza and Saxena (2013).

VARIABLES	(1)	(2)	(3)	(4)
Recovery	-0.462***	-0.462***	-0.462***	-0.463***
	(0.143)	(0.142)	(0.142)	(0.142)
FinancialCrisis				-0.720***
				(0.250)
Constant	3.849***	4.654***	4.654***	4.718***
	(0.141)	(0.412)	(0.412)	(0.409)
Observations	3,358	3,358	3,358	3,358
R-squared		0.061	0.061	0.064
Number of countries	134	134	134	134
Estimation	RE	FE	FE	FE
Time fixed effects	NO	NO	YES	YES
Number of recoveries	562	562	562	562

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

4.2 Commodity price-related exogenous shocks, resource dependence and recoveries

In this subsection, the results for the main hypothesis – insofar related to commodity price-related exogenous shocks – and the

[8] The Hausman specification test validated the use of a fixed effects model instead of a random effects model at p=0.0277. After determining that a fixed effects model best fits the data, time fixed effects were included. I find that the included time fixed effects dummies are not jointly equal to 0, indicating the necessity of the inclusion of time fixed effect dummies. By calculating a modified Wald-statistic for groupwise heteroscedasticity in the residuals of 0.000 I find evidence for the existence of different covariance structures between country clusters in the data. Therefore, clustered standard errors are best suited to get unbiased standard error estimates. Clustered standerd errors are calculated for all regressions performed in this research. The Wooldrigde test for serial correlation in panel data models gives no indication of the existence of serial correlation in the error term. The dependent variable – positive GDP per capita growth – is winsorised at the 99th percentile. Furthermore, for all regressions run in this research I control for the years in which there was a financial crises.

second hypothesis are presented. The results related to recoveries from recessions accompanied by boom-busts in commodity prices are discussed in § 4.2.1. and those for recoveries from recessions accompanied by a double bust in § 4.2.2.

4.2.1 Commodity price boom-busts, resource dependence and recoveries

The results for the main hypothesis and the second hypothesis for recoveries from recessions accompanied by boom-busts in commodity prices are presented in Table 4.

First, the results of the regression run on the specification of Cerra et al., (2013) as depicted in equation i) are presented in column (1), (4) and (7). Note that these regressions differ from the regressions presented in § 4.1, as *Recovery* no longer captures all the first expansion years after a recessionary period that are to be found in the data. After all, for the present regressions *Recovery* and *BoomBustRecovery* are mutually exhaustive and collectively exclusive. *Recovery* in column (i) of Table 3 captures recoveries not preceded by boom-busts in energy prices. Similarly, *Recovery* in column (4) and column (7) captures recoveries not preceded by, respectively, boom-busts in metal and ores prices, and boom-busts in the prices of agricultural goods.

For the purpose of testing the main hypothesis, several regression on specification ii) are performed. The results are depicted in column (2), (5) and (8) for the configurations of *BoomBustRecovery* with the different commodity price indices as underlying variables. For example, β_2 in column (5) captures the speed of economic recovery in the first year after a recessionary period that was accompanied by a boom-bust in metal and ores prices.

In columns (3), (6) and (9) *BoomBustRecovery* CommodityDependence* and *CommodityDependence* are added to the analysis. These regression results are relevant for testing the second hypothesis (H2 (a)).

Both in column (2) and (5), β_2 fails to be statistically significantly different from zero.

β_2 is statistically significantly lower than β_1 in column 8, with a p-value of 0.011 one the one-sided Wald-test. Therefore, the main hypothesis is confirmed for recoveries from recessions accompanied by boom-busts in the prices of agricultural goods. The results are not – with a p-value of 0.0660 – robust for less severe boom-busts, which are boom-busts with booms above the 25th percentile and busts below the 75th percentile (Appendix D1).

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Recovery (β1)	-0.698***	-0.700***	-0.686***	-0.644***	-0.644***	-0.642***	-0.407**	-0.414**	-0.411**
	(0.145)	(0.145)	(0.144)	(0.154)	(0.154)	(0.155)	(0.170)	(0.170)	(0.169)
BoomBustRecovery (β2)		-0.422	0.026		-0.484	-0.662*		-1.129***	-1.092***
		(0.324)	(0.354)		(0.351)	(0.368)		(0.266)	(0.332)
*BoomBustRecovery*CommodityDependence (β3)*			-0.034***			0.020			-0.008
			(0.013)			(0.021)			(0.027)
CommodityDependence (β4)			0.013**			-0.005			-0.015
			(0.006)			(0.015)			(0.014)
Constant	4.794***	4.794***	4.541***	4.823***	4.822***	4.874***	4.940***	4.934***	5.061***
	(0.422)	(0.422)	(0.426)	(0.430)	(0.431)	(0.418)	(0.439)	(0.437)	(0.448)
Commodity class	Energy	Energy	Energy	Metal	Metal	Metal	Agri	Agri	Agri
Observations	2,713	2,713	2,713	2,745	2,745	2,745	2,752	2,752	2,752
R-squared	0.100	0.101	0.109	0.099	0.100	0.101	0.095	0.103	0.104
Number of countries	124	124	124	124	124	124	124	124	124
P-value one-sided Wald-test (H0: B1 ≥ B2)	-	0.202	0.0290	-	0.333	0.479	-	0.0110	0.0280
P-value one-sided Wald-test (H0: B3 ≥ 0)	-	-	0.00400	-	-	0.170	-	-	0.380
Number of *Recovery*	286	286	286	316	316	316	332	332	332
Number of *BoomBustRecovery*	-	148	148	-	126	126	-	112	112
Robust standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

Table 4 - Boom-busts in commodity prices, resource dependence and the speed of recovery.

While the main hypothesis is confirmed for the regression depicted in column (8), the results are, not consistent with the results depicted in column (2) and (5).

The finding in column (2) and (5) that recoveries from recessions accompanied by boom-busts in commodity prices are not slower than recoveries from recessions without these respective shocks, is not surprising. As both resource dependent and resource independent economies are included in *BoomBustRecovery*, an explanation is that resource independent economies recover relatively well from a recession that was accompanied by a boom-bust in commodity prices, while resource dependent economies do not. Whether proof exists for this line of reasoning, is to be explored when testing the second hypothesis. As argued before, I expect that an asymmetry exists between resource dependent and resource independent economies.

With respect to the second hypothesis – see columns (3), (6) and (9) of Table 3 –, results are found that are mostly contrary to my expectations. It is observed that β_2 in column (3) and (6) is not different from zero.[9]

*BoomBustRecovery*CommodityDependence* grasps the variance in the dependent variable that is to be attributed to the existence of asymmetries between resource dependent and non-resource dependent economies with respect to first year growth after a recession accompanied by a boom-bust in commodity prices. From column (3) follows that the estimated coefficient for the interaction term is statistically significant (at the 1%-level) with an expected – be it very small – negative coefficient. The one-sided Wald-test indicates that β_3 is significantly smaller than 0. Hence, the second hypothesis is confirmed for energy dependent economies. This result is robust for less severe boom-busts in energy prices (Appendix D1). However, observing column (6) and (9) the results are inconsistent. Opposite to my expectations, the coefficients for the interaction terms column (6) and (9) are closely below or above zero and are statistically insignificant.

The beta coefficients for *BoomBustRecovery* CommodityDependence* with one and two years lags in the dependence measure are also estimated, as one might expect that an economy's commodity export dependence may be better captured by the dependence proxy in the years before recovery. The results found are not different from the earlier results (not reported).

As was observed in column 8, β_2 presented in column (9) is statistically significantly lower than β_1.[10]

The finding that, irrespective of an economy's commodity dependence, recoveries from recessions accompanied boom-busts in the prices of agricultural goods appears to be slower than recoveries not preceded by the respective booms (see column (9)), gives reason to re-evaluate the assumption that *BoomBust-Recovery*, as specified for these regressions, is normally distributed. It can be argued that countries with a business cycle that is heavily dependent on the export of specific commodities, is more likely to experience a recessionary period during a (sharp) price decline of the specific commodity. As such, recovery after this recessionary period is more likely, given that commodity prices

[9] The Wald-test indicates that β_1 and β_2 are statistically significantly different from each other. The interpretation of the p-value is slightly different in this case, due to the fact that I have constructed the Wald-test to test for directional hypotheses. The p-value indicates that, given this data, the probability of β_1 being equal or larger than β_2 is 0.0290, which is in line with observations.

[10] As is to be expected, the correlations between *Commodity-Dependence* and the configurations of *BoomBustRecovery*, and the correlations between *CommodityDependence* and *BoomBustRecovery*CommodityDependence* are relatively high. As a results multicollinearity could be an issue. With all correlation below 0.6 it appears there is no direct reason to worry about multicollinearity because of high correlation between the explanatory variables (Allison, 1999). As an additional check for multicollinearity, I calculate the variance inflation factor (VIF) for each of the variables in the model. These VIFs appear to be high for *CommodityDependence* in the model, with VIFs between 6 and 11. As CommodityDependence is only included as control variables and not as explanatory variables, this is not considered a problem (Allison, P. (2012, September). When Can You Safely Ignore Multicollinearity. Retrieved from https://statisticalhorizons.com/multicollinearity/). The VIFs for the explanatory variables are all below 4 – well below the 'rule of thumb' of 10.

subsequently increase. This would imply that the chance of experiencing a recovery from a recessions that was accompanied by a boom-bust in commodity prices, is biased towards resource dependent economies. If this is true, one could hypothesise that the researched asymmetry between resource dependent and non-resource dependent economies is not captured by *BoomBustRecovery*Commodity-Dependence*, but rather indirectly by *Boom-BustRecovery*. In the data evidence is found, suggesting that this is the case. *Boom-BustRecovery* is indeed biased towards resource dependent economies. 60-70% of the recoveries from recessions accompanied by boom-busts in commodity prices take place in economies that were above the median in terms of dependence on natural resources.

4.2.2 Double busts, resource dependence and recovery

The results for the main hypothesis and the second hypothesis for recoveries from recessions accompanied by a double bust are presented in Table 5.

Similar to § 4.2.1, first the results of running the the specification of Cerra et al., (2013) as depicted in equation i), are presented in column (1), (4) and (7). For the purpose of testing the main hypothesis, regressions have been performed on equation iii). The results are depicted in column (2), (5) and (8) for the configurations of *DoubleBustRecovery*, with different commodity price variables and gross total capital inflow as underlying variables. For example, β_2 in column (8) captures the speed of economic recovery in first year after a recessionary period that was accompanied by a simultaneous busts in the prices of agricultural goods and gross total capital inflow. In column (3), (6) and (9) *DoubleBustRecovery*Com-modityDependence* and *CommodityDepen-dence* are added to the analysis for the purpose of testing the second hypothesis (H2 (b)).

The results depicted in columns (2), (5) and (8) are relevant for the main hypothesis. In column (8) the coefficient of *DoubleBustRecovery* is lower than the coefficient of *Recovery* and also statistically significant. With a p-value of 0.0390 on the one-sided Wald-test, β_2 is even statistically significantly lower than β_1. It appears that that recoveries from recessions accompanied by a simultaneous busts in the prices of agricultural commodities and gross total capital inflows are statistically significantly slower than recoveries from recessions not accompanied by the respective double bust. However, these results are inconsistent with the results in columns (2) and (5), as in both columns β_2 is statistically insignificant and has a higher coefficient than β_1.

Table 5 - Double busts, resource dependence and the speed of recovery.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Recovery (β1)	-0.756***	-0.774***	-0.770***	-0.794***	-0.808***	-0.807***	-0.592***	-0.652***	-0.648***
	(0.171)	(0.170)	(0.168)	(0.180)	(0.178)	(0.178)	(0.182)	(0.182)	(0.182)
DoubleBustRecovery (β2)		-0.352	-0.353		-0.282	-0.386		-0.969***	-0.858**
		(0.541)	(0.639)		(0.485)	(0.546)		(0.357)	(0.430)
*DoubleBustRecovery*CommodityDependence (β3)*			0.002			0.012			-0.018
			(0.015)			(0.040)			(0.018)
CommodityDependence (β4)			0.011*			0.001			-0.005
			(0.006)			(0.017)			(0.014)
Constant	4.848***	4.847***	4.624***	4.881***	4.880***	4.867***	4.999***	5.004***	5.048***
	(0.414)	(0.414)	(0.417)	(0.420)	(0.420)	(0.403)	(0.433)	(0.432)	(0.429)
Commodity class									
Observations	2,355	2,355	2,355	2,392	2,392	2,392	2,400	2,400	2,400
R-squared	0.079	0.079	0.081	0.077	0.077	0.078	0.072	0.078	0.078
Number of countries	129	129	129	129	129	129	129	129	129
P-value one-sided Wald-test (H0: B1 ≥ B2)	-	0.225	0.260	-	0.155	0.235	-	0.211	0.322
P-value one-sided Wald-test (H0: B3 ≥ 0)	-	-	0.436	-	-	0.382	-	-	0.165
Number of *Recovery*	340	340	340	336	336	336	304	304	304
Number of *DoubleBustRecovery*	-	49	49	-	63	63	-	97	97

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

As discussed in § 4.2.1, the finding observed in column (2) and (5) are not surprising, given that both resource dependent and non-resource economies are included in *DoubleBust-Recovery*. However, further exploration of the existence of an asymmetry between resource dependent and non-resource dependent economies, provides little evidence of the existence of such an asymmetry.

With respect to the second hypothesis – (H2 (b)) –, the relevant results can be found in columns (3), (6) and (9). As can be seen the interaction picks up little, if any, variance in the dependent variable. No evidence is found for the existence of an asymmetry between resource dependent and non-resource dependent economies, with respect to the speed of growth in the first year of economic recovery from recessions accompanied by a double bust.[11]

4.3 Boom-busts in capital inflows and recovery

In this subsection, the results for the main hypothesis – insofar related to the financial exogenous shocks – and the third hypothesis are presented. The results of running regressions on equation ii) on the different configuration of *BoomBustRecovery* with measures of capital inflow as underlying variable are presented in § 4.3.1 After the results for the main hypothesis have been presented, the results for the third hypothesis are presented in § 4.3.2. For the purpose of testing the third hypothesis, regressions have been run on equation vi), with simultaneous inclusion of configurations of *BoomBustRecovery* with debt-like and equity-like measures as underlying variable.

4.3.1 Recoveries from recessions with and without financial exogenous shocks

Total net and total gross capital inflow. The results for the main hypothesis, running regressions on equation ii) – with configurations of *BoomBustRecovery* that have net and gross measures of total capital inflow as underlying variable – are depicted in Table 6.

Table 6 - Boom-busts in total capital inflow and recovery.

VARIABLES	(1)	(2)	(3)	(4)
Recovery (β1)	-0.530***	-0.566***	-0.233	-0.357*
	(0.188)	(0.186)	(0.200)	(0.201)
BoomBustRecovery (β2)		-0.328		-1.037***
		(0.266)		(0.204)
Constant	4.950***	4.945***	5.006***	4.993***
	(0.440)	(0.439)	(0.417)	(0.416)
Net/gross total capital inflow	Net	Net	Gross	Gross
Observations	3,072	3,072	2,800	2,800
R-squared	0.070	0.071	0.048	0.057
Number of countries	130	130	130	130
P-value one sided Wald-test (H0: B1 ≥ B2)	-	0.231	-	0.00600
Number of *Recovery*	338	338	324	324
Number of *BoomBustRecovery*	-	194	-	180
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Again, in order to confirm the main hypothesis, β_2 needs to be statistically significantly smaller than β_1. This is the case when the p-value on the one-sided Wald-test is smaller than 0.05. First, the results of the regression of Cerra et al., (2013) are presented in columns (1) and (3). Columns (2) and (3) are relevant for the main hypothesis. A first interesting finding is the difference in the beta estimate for *BoomBustRecovery* programmed with the net measure as underlying variable versus the one programmed with the gross measure as underlying variable. For the net measure configuration of *BoomBustRecovery* – column 2 –, β_2 has the expected negative sign, but the coefficient is larger than β_1. Furthermore, the empirical relation is not statistically significant.

[11] Again, with respect to issues related to multicollinearity in the model, high correlations between the interactions terms, the dependence measure and the configurations of *BoomBustRecovery* are observed. However, there is no need to worry about multicollinearity as the correlations between the explanatory variables are all below 0.6. The VIF's calculated for the explanatory variables in the model are all well below the 'rule of thumb' of 10.

As opposed to β_2 in column 2, β_2 in column (4) has a sizeable negative coefficient that is statistically significant. From the p-value of 0.00600 on the one-sided Wald-test follows that β_2 is statistically significantly lower than β_1. Hence, recoveries from recessions accompanied by a boom-bust in the gross measure of total capital inflow are slower than those recoveries from recessions not accompanied by the respective boom-bust.

These findings suggests that differentiating between the net capital inflow position and gross capital inflow position of an economy is relevant. The finding are robust for less severe boom-busts containing all consecutive booms above the 25th percentile and busts below the 75th percentile (Appendix D2).

Gross equity- and debt-like capital inflow

Next, the results for testing the main hypothesis with configurations of *BoomBustRecovery* that have measures of (i) gross debt inflow, (ii) gross FDI inflow and (iii) gross portfolio equity inflow as underlying variable, are presented in Table 7.

The results of the regression run on the specification of Cerra et al., (2013) as depicted in equation i) are presented in columns (1), (3), (5) and (7). The results depicted in columns (2), (4), and (6) are relevant for the main hypothesis.

A first observation is that all estimated beta coefficients for β_2 – in columns (2), (4) and (6) are both statistically significant and have a coefficient that is lower than β_1. The p-values of the one-sided Wald-test are smaller than 0.05 for the regressions depicted in column (4) and (6), while slightly above the threshold – p-value of 0.13) – for the regression depicted in column (2). The results in column (4) and (6) confirm the main hypothesis for configurations of *BoomBustRecovery* with total gross FDI inflow and total gross portfolio equity inflow as underlying variable. In the case of the configuration of *BoomBustRecovery* with gross total portfolio equity inflow as underlying variable, the results are robust for less severe boom-busts containing all consecutive booms above the 25th percentile and busts below the 75th percentile (Appendix D3).

Table 7 - Boom-busts in total capital inflow (by type) and the speed of recovery (gross measures).

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Recovery (β1)	-0.391**	-0.486**	-0.331*	-0.454**	-0.576***	-0.702***
	(0.190)	(0.191)	(0.184)	(0.186)	(0.213)	(0.213)
BoomBustRecovery (β2)		-0.805***		-0.995***		-1.383***
		(0.233)		(0.244)		(0.284)
Constant	5.011***	5.004***	4.970***	4.963***	4.398***	4.395***
	(0.418)	(0.417)	(0.430)	(0.428)	(0.330)	(0.325)
Underlying total capital inflow measure (gross)	Debt	Debt	FDI	FDI	Port. Equity	Port. Equity
Observations	2,806	2,806	2,793	2,793	1,905	1,905
R-squared	0.049	0.055	0.048	0.056	0.084	0.098
Number of countries	130	130	130	130	112	112
P-value one sided Wald-test (H0: B1b ≥ B2)	-	0.130	-	0.0320	-	0.0260
Number of *Recovery*	325	325	334	334	199	199
Number of *BoomBustRecovery*	-	179	-	168	-	69

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Evidence is provided that recoveries from recessions accompanied by boom-busts in both equity-like and debt-like capital inflow are slower than recoveries from recessions not accompanied by these respective boom-busts. With respect to confirmation of the first hypothesis, the results provide statistical proof that both recoveries from recessions accompanied by boom-busts in gross FDI inflow and gross portfolio equity inflow are slower than recoveries from recessions not accompanied by, respectively, boom-busts in gross FDI inflow and gross portfolio equity inflow. While no statistical proof is found for the main hypothesis with respect to the regression depicted in column (2), I do not

consider the difference between β_1 and β_2 trivial.

In essence, the finding that recoveries from recessions accompanied by boom-busts in equity-like capital inflows are slower than those without these respective boom-busts, while this does not hold for recoveries from recessions accompanied by boom-busts in debt-like capital inflows, is contrary to my expectations for the third hypothesis. My expectations for the third hypothesis are that recoveries from recessions accompanied by a boom-bust in debt-like capital inflows are slower than recoveries from recessions accompanied by a boom-bust in equity-like capital inflow. The third hypothesis will be formally tested in § 4.3.2.

Net equity- and net debt-like capital inflow

The results for testing the main hypothesis with configurations of *BoomBustRecovery* that have measures of (i) net debt inflow, (ii) net FDI inflow, (iii) net portfolio equity inflow and (iv) net guaranteed and non-guaranteed bank flows as underlying variable, are presented in Table 8.

The results depicted in column (2), (4), (6) and (8) are relevant for the main hypothesis. All the coefficients for β_2 are both statistically significant and have lower coefficients than β_1. While the differences between the β_1's and β_2's is not trivial, the p-values on the one-sided Wald-test in column (2), (4) and (6) are not below the 0.05 threshold value. In column 8, β_2 is statistically significant, with a large negative coefficient. Also the p-value is below the 0.05 threshold. As such the main hypothesis is confirmed for the configuration of *BoomBustRecovery* that has net total guaranteed and non-guaranteed bank flows as underlying variable.[12]

Surprisingly, β_1 in column (8) is not statistically significantly different from zero. As β_2 is statistically different from zero with a sizeable negative coefficient, it makes sense that β_2 is statistically significantly lower than β_1. A potential explanation for this finding is that recoveries from recessions are not slower than normal expansion years in general, but only if the preceding recession was accompanied by a boom-bust in net guaranteed and non-guaranteed bank flows. I consider this an interesting line of reasoning that ought to be further investigated in future research. However, β_2 is not statistically significantly lower than β_1 – p-value of 0.0867 for less severe boom-busts, containing all consecutive booms above the 25th percentile and busts below the 75th percentile (Appendix D4).

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Recovery (β1)	-0.413**	-0.505**	-0.401**	-0.509***	-0.707***	-0.843***	-0.179	-0.304
	(0.198)	(0.201)	(0.191)	(0.192)	(0.179)	(0.183)	(0.228)	(0.230)
BoomBustRecovery (β2)		-0.758***		-0.865***		-1.169***		-1.209***
		(0.198)		(0.235)		(0.261)		(0.270)
Constant	5.011***	5.005***	4.970***	4.966***	4.567***	4.557***	5.304***	5.296***
	(0.418)	(0.417)	(0.430)	(0.428)	(0.473)	(0.471)	(0.646)	(0.643)
Underlying total capital inflow measure (net)	Debt	Debt	FDI	FDI	Port. Equity	Port. Equity	Bank. Flows	Bank. Flows
Observations	2,806	2,806	2,793	2,793	2,108	2,108	1,854	1,854
R-squared	0.049	0.054	0.049	0.055	0.082	0.093	0.084	0.095
Number of countries	130	130	130	130	121	121	96	96
P-value one sided Wald-test (H0: B1b ≥ B2)	-	0.164	-	0.111	-	0.137	-	0.00190
Number of *Recovery*	316	316	333	333	210	210	221	221
Number of *BoomBustRecovery*	-	188	-	169	-	98	-	104

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8 - Boom-busts in total capital inflow (by type) and the speed of recovery (net measures).

[12] Note that the number of countries included in the analysis in column (7) and (8) deviates from the number of countries in the other columns. This is due to the fact that net total guaranteed and non-guaranteed bank flow data is not available for developed economies.

Similar as for the gross configurations of *BoomBustRecovery*, it can be observed that the p-value is highest for the regression where *BoomBustRecovery* is configured with debt as underlying variable and lowest for the regressions with *BoomBustRecovery* that are configured with equity-like measures as underlying variables. With respect to my expectations for the third hypothesis, I had expected the p-value in column (2) to be lower than those in columns (4) and (6).

4.3.2 Debt-like versus equity-like exogenous shocks

In this subsection the results of running the regressions on specification vi) are presented, enabling the formal testing of the third hypothesis. Specification vi) does not include *Recovery*, but includes *BoomBustRecovery* with configurations that have debt-like and equity-like capital inflow as underlying variable. To avoid confusion, *BoomBustRecovery* is renamed to *DebtBoomBustRecovery* and E*quityBoomBustRecovery*.[13] The results are presented in Table 9.

The results depicted in Table 9 are not in line with my expectations. The results presented in Table 7 and 8, already preliminarily indicated that the betas on the configurations of *BoomBustRecovery* with equity-like measures of capital inflow as underlying variable, have a more sizeable negative coefficient than the betas on the configurations of *BoomBustRecovery* with debt-like like measures of capital inflow as underlying variable. This is confirmed by the findings depicted in Table 9.

Based on these results, the third hypothesis cannot be confirmed. In many instances – see columns (1), (2), (3) and (4) – recoveries from recessions accompanied by a boom-bust in equity-like capital inflows are slower than recoveries from recessions accompanied by a boom-bust in debt-like capital inflows. In other instances – see columns (5) and (6) – the beta coefficients are more or less equal. No evidence is found for indicating that recoveries from recessions accompanied by a boom-bust in debt-like capital inflow are slower than recoveries from recessions accompanied by a boom-bust in equity-like capital inflow. In fact, if anything, the results provides evidence contrary to my expectations; recoveries from recessions accompanied by boom-busts in equity-like capital inflows appear to be slower than recoveries from recessions accompanied by boom-busts in debt-like capital inflows. Potential explanations these findings are discussed in § 6.1.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
EquityBoomBustRecovery (β1)	-0.672***	-0.755***	-0.736***	-0.608***	-1.046***	-0.941***
	(0.300)	(0.213)	(0.245)	(0.211)	(0.329)	(0.279)
DebtBoomBustRecovery (β2)	0.198	-0.480**	-0.519**	-0.448**	-1.039***	-0.972***
	(0.267)	(0.206)	(0.211)	(0.203)	(0.294)	(0.268)
Constant	4.273***	4.731***	4.388***	4.735***	5.023***	5.356***
	(0.396)	(0.318)	(0.358)	(0.318)	(0.552)	(0.441)
Net/gross capital inflows	Gross	Gross	Net	Net	Net	Net
Type of equity-like capital versus type of debt-like capital inflow	Port. equity vs Debt	FDI vs debt	Port. equity vs debt	FDI vs debt	Port. equity vs bank flows	FDI vs bank flows
Observations	1,948	2,875	2,162	2,875	1,186	1,700
R-squared	0.083	0.049	0.075	0.047	0.148	0.089
Number of countries	116	134	125	134	82	98
P-value one sided Waldt-test (H0: B1 ≥ B2)	0.984	0.790	0.718	0.683	0.506	0.529
Number of *EquityBoomBustRecovery*	69	168	98	169	98	169
Number of *DebtBoomBustRecovery*	179	179	137	188	104	104
Number of overlapping *Equity-* and *DebtBoomBustRecovery*	28	70	51	72	18	29
Standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

Table 9 - Boom-busts in debt-like capital inflow versus boom-busts in equity-like capital inflow and the speed of recovery.

[13] As mentioned in § 3.2.2 *DebtBoomBustRecovery* and *Equity-BoomBustRecovery* are not mutually exhaustive and collectively exclusive.

5 CONCLUSION

The purpose of the present research was to explore whether recoveries from recessions accompanied by exogenous real shocks and exogenous financial shocks are slower than recoveries from recessions not accompanied by these respective shocks. The hypotheses of this research were substantiated by the following line of reasoning. Exogenous shocks have an adverse and a persistent effect on the balance between savings and investments in an economy. Therefore, recoveries from recessions accompanied by exogenous shocks are expected to be slower than recoveries from recessions not accompanied by these respective shocks. To test the hypotheses of this research, different dummies that proxy for recoveries were programmed, such as recoveries from recessions accompanied by a boom-bust in either commodity prices or capital inflows. Additionally, a dummy capturing recoveries from recessions accompanied by simultaneous busts in commodity prices and capital inflows (a so-called double bust) was programmed.

Main hypothesis. In this research three hypotheses were tested. The main hypothesis was tested for both real exogenous shocks and financial exogenous shocks. For the main hypothesis it was hypothesised that recoveries from recessions accompanied by an exogenous shock are slower than recoveries without these respective shocks.

The main hypothesis is confirmed for recoveries from recessions accompanied by a boom-bust in the price of agricultural goods. However, the findings are inconsistent in the other commodity classes, where recoveries from recessions accompanied by a real exogenous shock are not found to be slower. This finding is not surprising, as the existence of an asymmetry between resource dependent and non-resource dependent economies is not taken into account when testing the main hypothesis.

Evidence was found confirming the main hypothesis for the financial exogenous shocks. With respect to total capital inflow, it is found that recoveries from recessions accompanied by boom-busts in gross total capital inflows are statistically significantly slower than recoveries from recessions not accompanied by boom-busts in gross total capital inflows. Recoveries from recessions accompanied by boom-busts in net total capital inflow – measured by the negative of the current account balance – are not slower than recoveries from recessions not accompanied by these respective boom-busts. The finding that the main hypothesis is confirmed when using the gross measure of total capital inflow and not confirmed when using the net measure of total capital inflow, is considered evidence that netting gross inflows and gross outflows does not allow for the appropriate differentiation of the behaviour of domestic investors and foreign investors, as has been argued in the academic literature (Forbes and Warnock, 2012; Johnson 2009).

Furthermore, for the purpose of the main hypothesis, it was assessed whether recoveries from recessions accompanied by debt- and equity-like capital inflows are slower than recoveries from recessions not accompanied by these respective shocks. Especially with respect to gross inflows, the results of the present research show that recoveries from recessions accompanied by boom-busts in equity-like inflows are slower than recoveries from recessions not accompanied by these respective boom-busts.

Second hypothesis. For the second hypothesis it was explored whether asymmetries are existent between resource dependent and non-resource dependent economies in the speed of economic recovery from recessions accompanied by commodity price-related exogenous shocks. Contrary to my expectations, little, if any evidence, was found for the existence of the hypothesised asymmetry. Energy dependent economies experience slower recoveries from recessions accompanied by boom-busts in energy prices compared to non-resource dependent economies. While the effect is statistically significant, the size of the effect is small. Furthermore, the results are not consistent with the results found for resource dependent economies in other commodity classes; no asymmetries are found in economies dependent on the export of metal and ores, and economies dependent on the export of

agricultural goods. Also no asymmetries are found between resource dependent economies and non-resource dependent economies when recovering from a double bust.

Third hypothesis. For the third hypothesis only recoveries from recessions accompanied by a boom-bust in capital inflow were considered. It was hypothesised that recoveries from recessions accompanied by boom-busts in debt-like capital inflows are slower than recoveries from recessions accompanied by boom-busts in equity-like capital inflows. This hypothesis is not confirmed on the basis of the results presented in this research. If anything, the evidence presented suggests that it is more likely that recoveries from recessions accompanied by boom-busts in equity-like capital inflows are slower than recoveries accompanied by boom-busts in debt-like capital inflows.

6 DISCUSSION, LIMITATIONS AND FUTURE RESEARCH

In the last section of this research follows an elaboration on some of the findings of this research. Furthermore, limitations of the present research are discussed and suggestions for future research are formulated.

6.1 Discussion

In line with my expectations, recoveries from recessions accompanied by a boom-bust in gross total capital inflow are slower than recoveries from recessions not accompanied by these respective shocks. At first sight, these findings appear to be contrary to the findings of Calvo et al. (2006), who find that recoveries from output collapses that were preceded by extreme drops in capital inflows are relatively speedy. A potential explanation that can be put forward, is that the phenomenon of unexpected and extreme drops in capital inflows is not the same as a boom-bust in capital inflows, since a sudden stop may be considered temporary while a boom-bust is potentially of a more structural nature.

In this research it was hypothesised that recoveries from recessions accompanied by boom-busts in debt-like capital inflows are slower than recoveries from recessions accompanied by boom-busts in equity-like capital inflows. As aforementioned, the results of this research suggests that is more likely that recoveries from recessions accompanied by boom-busts in equity-like capital inflows are slower than recoveries from recessions accompanied by boom-busts in debt-like capital inflows. Although my expectations were different, these findings would be compatible with the findings of Claessens et al. (2012), who find busts in credit to have no statistically significant effect on the recessionary phase of the business cycle. It does, however, contradict the perceived view of a pecking order in capital inflows often mentioned in the academic literature, with boom-busts in one type of capital inflow having more severe adverse effect on real economic activity than other types of capital inflow. In decreasing order of riskiness this pecking order entails: debt inflows, portfolio equity inflows and FDI inflows (Furceri et al., 2012a).

Finding that were contrary to my expectations have led me to re-evaluate some of the arguments made in my theoretical framework for substantiating the hypotheses in this research and the third hypothesis in particular. In the theoretical framework it is substantiated that recoveries from recessions accompanied by exogenous shocks are slower than recoveries from recession not accompanied by these shocks, because exogenous shocks have an adverse and persistent effect on the balance between savings and investments in an economy, hindering the speed of economic recovery after the recessionary period. The adverse effect of a boom-busts in debt-like capital inflows on real economic activity was considered larger that the adverse effect of a boom-bust in equity-like capital inflows. An alternative line of reasoning ought to be considered.

It could also be argued that the bust in capital inflows to an economy, is the result of foreign investors re-evaluating the return prospects of an economy. In this event, the shock is not the cause for slow subsequent economic recovery, but rather a symptom; the bust in capital inflow occurs because poor economic performance – including slow recovery after a recession – is anticipated by foreign investors. These endogeneity issues are actually not uncommon when estimating the effect of shocks on some performance measure. As put by Cerra and Saxena (2008) the shock itself *"may be a function of a slowdown of economic growth or changes in expectations of future growth"*.

In this research it was primarily argued that boom-busts in debt-like capital inflows result in more frictions – as the absence of foreign credit has the largest distortive impact – between the financial sector and the real economy, while boom-busts in equity-like capital inflows – which are small fraction of total capital inflows if one compares them to debt-like capital inflows – were considered to cause for less frictions in funding real economic activity. However, the third hypothesis could also have been substantiated with signal argument

mentioned above. Rather than considering the adverse effects of a boom-bust in a particular type of capital inflow on real economic activity, one could consider what a bust in capital inflows – triggered by a re-evaluation of the return prospects of an economy by foreign investors – signals about the prospects of the particular economy.

Hence, one would also have to take into account that different capital inflows come with investors that have differing risk preferences, as FDI and equity investors generally have higher risk preferences than debt investors. From here, one could argue that busts triggered in equity-like capital inflows sends a more worrying signal about the prospects of an economy, as even investors with high risk preferences lower their exposure to an economy.

6.2 Limitations and future research

As with any research, the present research suffers from several limitations. In the last section of this research some limitations related to the data used in this research are mentioned. This section ends with some recommendations for future research.

Resource dependence and commodity price measures. One of the limitations of this research relates to the resource dependence and commodity price measures used. Gross dependence measures – e.g. fuel exports as a percentage of total merchandise exports – are used, while a net dependence measure may be more appropriate. For example, an economy with no natural resources wealth may have a large petrochemical industry and is, as a result, dependent on the export of refined oil products, but at the same time also highly dependent on the import of crude oil. Hence, my gross dependence measure is potentially a biased dependence measure.

Future research may benefit from a dependence measure that is better configured to proxy for an economy's dependence on the export of natural resources taking into account the different characteristics of an economy. The Extractives Dependence Index ("**EDI**") introduced by Hailu and Kipgen (2017) can offer guidance in this respect. The EDI takes into account i) the share of commodity export earnings in total export earnings, ii) the share of fiscal revenues stemming from exports as a share of total fiscal revenues and iii) the value added by the commodity exports industry to total GDP. I consider the EDI more accurate and superior to the methods used in this research. However, using it will come with the disadvantage of reduced sample size.

Furthermore, this research distinguishes between energy prices, ores and metal prices and the prices of agricultural goods. While segmentation is always imperfect in a world with many different commodities, the segmentation used in this research is particularly raw and, therefore, imperfect. Future research could benefit from more accurately specified real exogenous shocks by using a less raw segmentation.

Data frequency. Another limitation of the present research relates to the data frequency. Yearly data is used, which has the advantage of being available over long time periods for many countries. While the use of yearly data is advantageous with respect to sample size, it has the disadvantage that information on the interaction between the exogenous shocks and real economic activity is lost. It is likely that quarterly data is better suited for the exploration of the complex interactions between exogenous shocks, recessions and subsequent recoveries. Hence, it would be interesting to explore elements of the present research with quarterly data, but would come at the cost that less countries can be included and the research would span a shorter time span.

The direction of causality. In the above, endogeneity issues, also referred to as an identification problem, were already mentioned. The essence of the problem is that observing correlation in, for example, boom-busts in capital inflows and subsequent economic growth, does not necessarily tell anything about the direction of causality. If one assumes causality – as is done in the present research – one can easily mistake the direction of causality.

Many scholars devote attention to this standard identification problem that occurs when

analysing the mechanisms linking financial shocks and real economic activity, such as Rajan and Zingales (1998), Kroszner, Laeven and Klingebiel (2007) and Dell'Ariccia, Detragiache and Rajan (2008). The goal is to assess whether the shocks exogenously hinder economic growth, rather than the shock being an endogenous function of slower expected growth. Scholars tackling these identification problems classify an economy in industrial sectors based on their dependence on a particular source of capital, such as debt capital. For example, if one finds that industries heavily dependent on debt financing perform relatively worse during a recessions accompanied by a financial shock – e.g. a banking crisis – one can infer that the shock affects real economic activity.

The present research would greatly benefit from a similar approach. However, employing this strategy would mean the use of more detailed performance data, reducing the number of countries included in the analysis. As sector performance data is not widely available for poorer resource dependent economies, these countries are to be excluded from the analysis.

The persistence of the shock. The present research does not take into account the persistence of a shock. For example, after the boom-busts has occurred, the start of a new boom is not considered. However, there are many reasons to argue that characteristics of the new boom phase are important for determining the shape of the business cycle and, therefore, affect the speed of economic recovery from a recession.

The pecking order in capital inflows. The finding that recoveries from recessions accompanied by boom-busts in equity-like capital inflows appear to be slower than recoveries from recessions accompanied by boom-busts in debt-like capital inflows, is contrary to the pecking order in capital inflows. Based on the pecking order in capital inflows, one would expect boom-busts in debt inflows to have more severe adverse effect relative to boom-busts in equity and FDI inflows. A further exploration of this supposed pecking order in capital inflows deserves attention in future research.

To be considered in the further exploration of the pecking order in capital inflows, is the research of Reinhardt and Dell'Erba (2013). Their research suggests that the separation of elements within a certain type of capital inflow could provide the researcher with valuable information. According to the pecking order among inflows, FDI is considered relatively safe. However, Reinhardt and Dell'Erba (2013) have shown considerable within group variation in FDI inflow. When FDI inflows are separated into FDI inflows to the financial sector and FDI inflows to the primary and manufacturing sector, the scholars show that considerable differences are found with respects to the effects of surges in capital inflows on boom-busts in GDP; surges in FDI to the financial sector are associated with boom-busts in GDP, while surges in FDI to the primary and manufacturing sector are not associated with boom-busts in GDP. The scholars attribute the finding that booms in FDI inflow to the financial sector are accompanied by relatively high volatility in economic growth to the factor of domestic credit, primarily provided by foreign banks.

Based on the findings of Reinhardt and Dell'Erba (2013) and the findings of the present research, one could argue that the role of credit on the business cycle – i.e. the speed of economic recovery from a recession – is relevant, but just not appropriately captured by debt inflows, and non-guaranteed and guaranteed bank flows. Therefore, for future research it is recommended to use FDI data that is split into its different components. Rather than only considered debt inflows and, non-guaranteed and guaranteed bank flows, considering the role of FDI on domestic credit in an economy may provide for valuable insights.

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8 APPENDICES

A – Variable descriptions

Variable name	Variable description	Source
	Dependent variable	
Per capita GDP growth	GDP per capita growth in percentages.	Alfaro, Kalemli-Ozcan and Volosovych (2014)
	Commodity export data	
Fuel	Fuel exports as percentage of merchandise exports.	World Development Indicators (World Bank,
Metal	Ores and metals exports as percentage of merchandise exports.	World Development Indicators (World Bank, 2018)
Agri	Agricultural raw materials exports as percentage of merchandise exports.	World Development Indicators (World Bank, 2018)
	Commodity prices	
EnergyPrice	Index of annual energy prices (coal, crude and gas). Constant 2005 US dollars, 2010=100.	World Bank Commodity Price Data: the Pink Sheet (World Bank, 2018)
MetalPrice	Index of annual metal & mineral prices (excluding precious metals). Constant 2005 US dollars, 2010 =100.	World Bank Commodity Price Data: the Pink Sheet (World Bank, 2018)
AgriPrice	Index of annual prices of raw material agricultural goods (excluding fertilisers). Constant 2005 US dollars, 2010=100.	World Bank Commodity Price Data: the Pink Sheet (World Bank, 2018)
	Net and gross proxies of total capital inflow	
Total net inflow	The negative of the current account, as a percentage of GDP (net).	(Alfaro, Kalemli-Ozcan and Volosovych, 2014)
Total gross inflow	Total inflows as a percentage of GDP (gross).	(Alfaro, Kalemli-Ozcan and Volosovych, 2014)
	Capital inflow by type	
Total net and gross debt inflow	Total debt inflows as a percentage of GDP (net and gross).	(Alfaro, Kalemli-Ozcan and Volosovych, 2014)
Total net and gross portfolio equity inflow	Portfolio equity capital inflows as percentage of GDP (net and gross).	(Alfaro, Kalemli-Ozcan and Volosovych, 2014)
Total net and gross FDI inflow	FDI capital inflows as percentage of GDP (net and gross).	(Alfaro, Kalemli-Ozcan and Volosovych, 2014)
Total net gtd and non-gtd net bank inflow	Guaranteed and non-guaranteed bank flows as percentage of GDP (net).	(Alfaro, Kalemli-Ozcan and Volosovych, 2014)
	Control variables and other	
CrisisDummy	Dummy variable taking the value of 1 if systematic banking crises, currency crises and sovereign debt crises, 0 otherwise.	(Laeven and Valancia, 20108; 2018)
Population	A country's population.	(Alfaro, Kalemli-Ozcan and Volosovych, 2014)
RICHOECD	Dummy taking the value of 1 if an economy qualifies as a developed economy, 0 otherwise.	(Alfaro, Kalemli-Ozcan and Volosovych, 2014)
RAWDEVSMPL	Dummy taking the value of 1 if a country qualifies as a developing economy.	(Alfaro, Kalemli-Ozcan and Volosovych, 2014)

B – Data handling and programming

For the purpose of replicability, this appendix elaborates on the data handling and programming of *BoomBustRecovery* and *DoubleBustRecovery*. First, a description is given of how this research dealt with missing values in the capital inflow measures. Second, the use of Stata's SBBQ- and TSSPELL-module for the identification of peaks, troughs and cycles in the commodity price and capital inflow data is elaborated upon. Third, the manner in which *DoubleBustRecovery* is programmed, is elaborated upon.

Dealing with missing values. Many of the capital inflows measures contain missing values. Dealing with these missing values in a proper manner is important. Also, the SBBQ-module used for the identification of peaks and troughs, cannot deal with missing values. As the number of missing values is different for each financial variable, one needs to be cautious with accidently deleting valuable information from the dataset.

In this research, in turn, each financial variable was detached from the master dataset, in order to deal with missing values separately. After detachment from the master dataset, missing values at the beginning and the end of the panel were dropped. With this procedure most of the

missing values are removed from the dataset. However, some panels contain missing values within spells of non-missing values. In these cases, the longest spell of non-missing values before or after a spell of missing values was kept.

Another data issue that had to be dealt with relates to the existence of some long spells of observations in the data with zero inflow. Since one of the goals of this research is to investigate the speed of recovery from recessions accompanied by a boom-bust in capital inflow relative to recoveries from recessions not accompanied by these respective shocks, recoveries of countries that have no variation in (a specific type of) capital inflow are not to be included. A maximum of two consecutive observations with zero capital inflow is allowed. For all the other spells of observations with zero flow, the same strategy is used as the one used for dealing with the missing values. In a few cases, the length of spells before and after the spell of missing values is identical. In these cases the first spell of non-missing values is kept. One ought to be very prudent with filling missing values and do so only when one or two values were missing. This only happens in two instances, namely for the negative current account measure in Greece and the Islamic Republic of Iran.

SBBQ- and TSSPELL-module in Stata. The *SBBQ*-module of statistical software package Stata is used as an implementation of the Bry and Boschan (1971) algorithm. The module assigns a 1, -1 and 0 to, respectively, a peak, a trough and anything between a peak and a trough. On the use of the *SBBQ*-module is elaborated upon, since the model does not allow for panel structured data. This issue is resolved by performing a temporary reshape of the data into wide format, resulting in a dataset with only variables in time series structure. Subsequently, a SBBQ-loop was run on the relevant variables. After the loop the data is restored into a panel structured dataset.

TSSPELL gives a spell identifier dummy and a sequence dummy taking the value of 1 in the first year of the spell, the value of 2 in the second year of the spell and so forth. This spell identifier is used to identify spells in the boom dummies and bust dummies, described in section § 3.2.1. After running the spell identifier on these dummies, boom/busts are defined from trough/peak onwards. Hence, booms and busts at the beginning of the panel are not recognised. In order to capture these boom/busts as well, the fact is used that these booms and busts are uniquely identified by the data on the turning points, the boom and bust dummy and sequence of the spell from TSSPELL. For most hypotheses, the only interest is with booms at the beginning at the beginning of the panel, as the focus is on booms followed by busts. However, for the construction of the double bust dummy, the identification of busts at the beginning of the panel is wanted.

Double busts. In essence, three scenarios are considered for the generation of *DoubleBustRecovery*. In the first scenario, the bust phase in both the commodity prices variable and the capital inflow variable start simultaneously. *DoubleBustRecovery* is assigned the value of 1 under the condition that the other two bust dummies take the value of 1. As long as the subsequent observations in the two specific bust dummies have the value of 0, the double bust dummy is assigned the value of 1. Since both phases under this scenario have started simultaneously, a spell of two 1's is required to be considered a double bust. From the third observation onwards in a spell of 1's in the double bust dummy, the definition of the double bust is satisfied.

In most instances, the bust phases in the commodity prices and capital inflow variables do not start simultaneously. Hence, in these instances the phase in one variable starts before the bust phase in the other variable. The second scenario considered is the scenario in which the bust phase in the commodity price index starts at *t=0* and the bust in the capital inflow variable starts at *t+1* or *t+2*. The third scenario is opposite to the second scenario; the bust phase in the capital inflow variable starts at t=0 and the bust in the commodity price index starts at *t+1* or *t+2*. In these scenarios a double bust dummy is assigned the value of 1 from *t=0* onwards. If the bust phase in one of the variables ends, the double bust dummy is no longer assigned the value of 1. In the *t+1*-scenario a spell of three 1's is required for the double bust definition to be satisfied and in the *t+2*-scenario a spell of four 1's is required for the double bust definition to be satisfied. This is line with the concept of the double bust as defined by Reinhart et al. (2016).

C – Fixed effects model

The intuitive general technique behind fixed effects estimations is shown in the following equations:

i) $Y_{c,t} = \beta_1 X_{c,t} + u_c + \varepsilon_{c,t}$

In equation i) subscript c represent the country and t represent the year. Y is the dependent variable and X represents a vector of regressors. $u_c + \varepsilon_{c,t}$ is the composite error term whereby u_c captures the unobserved time-invariant heterogeneity and $\varepsilon_{c,t}$is the idiosyncratic time varying error term.

ii) $\overline{Y_c} = \beta_1 \overline{X_c} + u_c + \bar{\varepsilon}_c$

By averaging equation 1 over time, one gets the time averaged equation represented in equation ii).

iii) $(Y_{c,t} - \overline{Y_\iota}) = \beta_1 (X_{c,t} - \bar{X}_c) + (u_c - u_c) + (\varepsilon_{c,t} - \bar{\varepsilon}_c)$

In order to get the fixed effects equation, one subtracts equation ii) from equation i) and gets equation iii).

iv) $\ddot{Y} = \beta_1 \ddot{X}_{c,t} + \ddot{\varepsilon}_{c,t}$

Equation iii) can be simplified in the form of the time demeaned equation represented in specification iv). As can be derived from specification i)-iv), fixed effects estimations removes the time-invariant and country specific effect u_c from the estimation (Wooldridge, 2013).

D – Robustness

VARIABLES	(1)	(2)	(3)
Recovery (β1)	-0.709***	-0.713***	-0.703***
	(0.158)	(0.159)	(0.158)
BoomBustRecovery (β2)		-0.447	-0.019
		(0.285)	(0.337)
*BoomBustRecovery*CommodityDependence (β3)*			-0.030**
			(0.012)
CommodityDependence (β4)			0.013**
			(0.006)
Constant	4.793***	4.794***	4.536***
	(0.422)	(0.422)	(0.426)
Commodity class	Energy	Energy	Energy
Observations	2,713	2,713	2,713
R-squared	0.100	0.101	0.108
Number of countries	124	124	124
P-value one-sided Wald-test (H0: B1 ≥ B2)	-	0.197	0.0370
P-value one-sided Wald-test (H0: B3 ≥ 0)	-	-	0.00800
Number of *Recovery*	261	261	261
Number of *BoomBustRecovery*	-	173	173

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

D1 - Robustness - Boom-busts in com-modity prices, resource dependence and the speed of recovery.

VARIABLES	(4)	(5)	(6)	(7)	(8)	(9)
Recovery (β1)	-0.679***	-0.683***	-0.681***	-0.410**	-0.417**	-0.418**
	(0.164)	(0.165)	(0.166)	(0.192)	(0.191)	(0.191)
BoomBustRecovery (β2)		-0.486*	-0.607**		-0.893***	-0.869***
		(0.252)	(0.267)		(0.240)	(0.307)
*BoomBustRecovery*CommodityDependence (β3)*			0.015			-0.004
			(0.016)			(0.027)
CommodityDependence (β4)			-0.006			-0.014
			(0.015)			(0.014)
Constant	4.824***	4.823***	4.878***	4.939***	4.936***	5.057***
	(0.430)	(0.431)	(0.419)	(0.438)	(0.438)	(0.450)
Commodity class	Metal	Metal	Metal	Agri	Agri	Agri
Observations	2,745	2,745	2,745	2,752	2,752	2,752
R-squared	0.098	0.100	0.101	0.095	0.102	0.103
Number of countries	124	124	124	124	124	124
P-value one-sided Wald-test (H0: B1 ≥ B2)	-	0.242	0.403	-	0.0660	0.108
P-value one-sided Wald-test (H0: B3 ≥ 0)	-	-	0.160	-	-	0.437
Number of *Recovery*	255	316	255	243	243	243
Number of *BoomBustRecovery*	-	187	187	-	201	201

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

D1 (continued.)

VARIABLES	(1)	(2)	(3)	(4)
Recovery (β1)	-0.559***	-0.616***	-0.021	-0.183
	(0.213)	(0.214)	(0.234)	(0.235)
BoomBustRecovery (β2)		-0.363*		-0.882***
		(0.204)		(0.187)
Constant	4.949***	4.944***	5.002***	4.995***
	(0.440)	(0.440)	(0.418)	(0.417)
Net/gross total capital inflow	Net	Net	Gross	Gross
Observations	3,072	3,072	2,800	2,800
R-squared	0.069	0.071	0.047	0.057
Number of countries	130	130	130	130
P-value one sided Wald-test (H0: B1 ≥ B2)	-	0.184	-	0.00600
Number of *Recovery*	241	241	203	203
Number of *BoomBustRecovery*	-	291	-	301

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

D2 - Robustness - Boom-busts in total capital inflow and the speed of recovery.

VARIABLES	(3)	(4)	(5)	(6)	(7)	(8)
Recovery (β1)	-0.493**	-0.603***	-0.710***	-0.878***	-0.267	-0.386
	(0.199)	(0.204)	(0.184)	(0.190)	(0.244)	(0.249)
BoomBustRecovery (β2)		-0.648***		-1.018***		-0.806***
		(0.191)		(0.215)		(0.246)
Constant	4.974***	4.969***	4.570***	4.558***	5.306***	5.299***
	(0.430)	(0.429)	(0.475)	(0.471)	(0.646)	(0.644)
Underlying total capital inflow measure (net)	FDI	FDI	Port. Equity	Port. Equity	Bank. Flows	Bank. Flows
Observations	2,793	2,793	2,108	2,108	1,854	1,854
R-squared	0.049	0.054	0.081	0.093	0.084	0.091
Number of countries	130	130	121	121	96	96
P-value one sided Wald-test (H0: B1b ≥ B2)	-	0.428	-	0.285	-	0.0867
Number of *Recovery*	248	248	161	161	169	169
Number of *BoomBustRecovery*	-	254	-	147	-	156

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

D4 (continued.)

VARIABLES	(1)	(2)	(3)	(4)	(5)	-6
Recovery (β1)	-0.261	-0.395*	-0.356*	-0.485**	-0.452**	-0.627***
	(0.215)	(0.217)	(0.208)	(0.211)	(0.227)	(0.226)
BoomBustRecovery (β2)		-0.778***		-0.770***		-1.283***
		(0.196)		(0.198)		(0.262)
Constant	5.009***	5.003***	4.971***	4.965***	4.392***	4.401***
	(0.418)	(0.417)	(0.430)	(0.429)	(0.330)	(0.327)
Underlying total capital inflow measure (gross)	Debt	Debt	FDI	FDI	Port. Equity	Port. Equity
Observations	2,806	2,806	2,793	2,793	1,905	1,905
R-squared	0.048	0.055	0.048	0.055	0.082	0.098
Number of countries	130	130	130	130	112	112
P-value one sided Wald-test (H0: B1b ≥ B2)	0	0.0770	0	0.141	0	0.0260
Number of *Recovery*	235	235	247	247	167	167
Number of *BoomBustRecovery*	0	269	0	255	0	101

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

D3 - Robustness - Boom-busts in total capital inflow (by type) and the speed of recovery (gross measures).

VARIABLES	(1)	(2)
Recovery (β1)	-0.391*	-0.489**
	(0.204)	(0.207)
BoomBustRecovery (β2)		-0.763***
		(0.186)
Constant	5.012***	5.004***
	(0.417)	(0.417)
Underlying total capital inflow measure (net)	Debt	Debt
Observations	2,806	2,806
R-squared	0.049	0.054
Number of countries	130	130
P-value one sided Wald-test (H0: B1b ≥ B2)	-	0.141
Number of *Recovery*	303	303
Number of *BoomBustRecovery*	-	201

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

D4 - Boom-busts in total capital inflow (by type) and the speed of recovery (net measures).