

# Financial liberalisation and economic growth: A meta-analysis



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## **List of abbreviations**

ADR	American depositary receipt
AREAER	Annual Report on Exchange Arrangements and Exchange Restrictions
FAT	funnel graph asymmetry test
FDI	foreign direct investment
GDP	gross domestic product
IFC	International Financial Corporation
IMF	International Monetary Fund
NBER	National Bureau of Economic Research
NUYCO	number of years with controls
OECD	Organisation for Economic Co-operation and Development
PET	precision effect test
RePEc	Research Papers in Economics
SSRN	Social Science Research Network

## **Abstract**

This study provides a systematic analysis of the empirical literature on the relationship between financial liberalisation and economic growth by conducting a meta-analysis, based on 441 t-statistics reported in 60 empirical studies. To our knowledge, this is the first study using meta-analysis as a tool to investigate the financial liberalisation-growth nexus. We focus on explaining the heterogeneity of results reported in the studies in our sample, investigating the importance of study-, data- and method-specific characteristics. Although our results indicate that, on average, there is a positive effect of financial liberalisation on growth, the significance of this effect is only weak. Next, we find that most of the variables that may help explaining the heterogeneity of results regarding the relationship between financial liberalisation and economic growth do not produce any significant results. There are two exceptions. Our analysis suggests that financial liberalisation policies carried out during the 1970s seem to have a stronger negative relationship with growth. Moreover, our results show that studies that take into account a measure of the level of development of the financial system report lower t-statistics for the relationship between liberalisation and growth.

## 1. Introduction

During the past two decades, many countries have reformed their domestic financial markets. In many cases, these reforms were triggered by domestic and international developments. Domestically, many government policies that focused on controlling financial markets - known in the literature as financial repression - became increasingly criticised, for it was felt that these policies were blocking the efficient functioning and development of financial institutions. The idea that stagnating economic growth and economic crisis were related to financial repression policies has gained ground since the early 1970s (McKinnon 1973, Shaw 1973).<sup>1</sup> Internationally, the globalisation of markets, including financial markets, also put pressure on governments to reconsider financial market controls. The profoundness of these reforms raises questions regarding the potential consequences of foreign liberalisation on economic growth.

Reforms of financial markets include several specific policies which in one way or another aim at contributing to higher economic growth. Several authors claim that liberalisation of financial markets raises the efficiency with which these markets can transform saving into investment, which ultimately should improve growth performance. At the same time, however, financial liberalisation policies have been criticised for their potential role in triggering financial and economic crises in the past. The question, therefore, is whether or not these policies lead to higher economic growth. Several papers have looked into this debate from an empirical point of view. The general picture that emerges from *standard* literature surveys is that the evidence remains inconclusive.<sup>2</sup> However, these review studies do not attempt to systematically investigate the outcomes of empirical studies of the financial liberalisation-growth nexus. In light of this gap, this study conducts meta-analysis of the relationship between financial liberalisation and economic growth, based on 60 empirical studies, to provide a more systematic review of the available evidence.

Meta-analysis is a methodology that provides a statistical approach to reviewing and summarising the literature (Stanley 2001). According to Florax et al. (2002:1): ‘...meta-analysis is more “objective” than the traditional literature review, although it is not necessarily free from subjectivity either.’ This methodology allows us to draw a more comprehensive picture of the impact of financial liberalisation on growth than we may arrive at when looking at small set of studies. By using meta-analysis, each study is taken as one single observation containing information on the nature of the relationship between financial liberalisation and economic growth. Recently, a growing number of meta-analyses have been published in economics on issues such as the relationship between aid and growth (Doucouliagos and Paldam 2007, 2009), central bank independence and inflation (Klomp and De Haan 2010), investment and uncertainty (Koetse et al. 2009), economic freedom and growth (Doucouliagos and Ulubaşoğlu 2008), democracy and growth (Doucouliagos and Ulubaşoğlu 2008), income inequality and growth (De Dominicis et al. 2008) and fiscal policies and growth (Nijkamp and Poot 2004). To our knowledge, this is the first study using meta-analysis as a tool to investigate the financial liberalisation-growth nexus.

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<sup>1</sup> See Fry (1995) for a comprehensive overview of the discussion on financial repression.

<sup>2</sup> For comprehensive surveys of the empirical literature, see, e.g. Brownbridge and Kirkpatrick (2000), Eichengreen (2001), Henry (2003, 2007), Hermes and Lensink (2008) and Kose et al. (2006a, 2006b).

In the meta-analysis, we specifically take into account the following issues. First, we focus on exploring the sources of heterogeneity of findings reported in different studies. For this, we start by investigating whether the choice of the financial liberalisation measure has an impact on the results reported in different studies. Next, we analyse the potential impact of study design on results reported. In particular, we focus on the impact of differences between studies regarding country samples, time periods, and estimation methods. Moreover, we explicitly focus on indirect effects of financial liberalisation on economic growth. Second, we analyse whether studies suffer from a potential publication bias (also sometimes referred to as the file drawer problem), i.e. whether results published provide a biased distribution of effects found, because there may be a tendency not to publish results that show insignificant results.

The remainder of this study is organised as follows. Section 2 provides a short review of the debate on financial liberalisation and its potential effects on economic growth. In section 3 we discuss how studies have dealt with the measurement of financial liberalisation. Section 4 provides an overview of the data collection procedure, descriptive statistics and the methodology we use to carry out the meta-analysis. Moreover, section 4 discusses the results of the meta-analysis in detail. The study ends with a conclusion, in which we discuss limitations of this review and suggestions for further research in section 5.

## 2. Financial liberalisation and economic growth: the debate

The financial system performs a number of important functions in an economy. Basically, it takes care of mobilising financial resources, facilitating risk management, allocating resources to the most efficient projects, monitoring the use of financial resources (exerting corporate governance), and providing a payment system that makes trade among economic participants more efficient (Levine 1997). Financial development occurs when a financial system is able to improve on performing these functions. There is a large body of theoretical and empirical work emphasising that financial development is positively associated with economic growth.<sup>3</sup>

Closely related to the discussion of the relationship between finance and growth is the discussion of the role that financial liberalisation can play in this relationship. The main idea is that financial liberalisation may impact on financial development which, in turn, affects economic growth. There is an ongoing debate about whether the role of financial liberalisation with respect to the finance-growth nexus is positive or negative.<sup>4</sup>

While there may be several different characterisations of what financial liberalisation contains,<sup>5</sup> in most studies financial liberalisation includes official government policies that focus on deregulating credit as well as interest rate controls, removing entry barriers for foreign financial institutions, privatising financial institutions, and removing restrictions on foreign financial transactions. Hence, financial liberalisation has both a domestic and foreign dimension. In general, liberalisation focuses on introducing or strengthening the price mechanism in the market, as well as improving the conditions for market competition.

In the literature, several arguments in favour of liberalisation have been put forward. Most of these arguments implicitly start from the neoclassical perspective, which assumes that markets are most efficient in allocating scarce resources. The discussion on liberalising financial markets started with the seminal publications of McKinnon (1973) and Shaw (1973). Both scholars wrote their work as a critique of government policies, which were focused on restricting and controlling financial markets, also known as *financial repression*. Among other things, these policies consisted of establishing interest rate ceilings, and government directed credit and subsidies to banks, leading to excess demand and inefficient allocation of capital. McKinnon (1973) and Shaw (1973) held these policies responsible for the low growth rates in many developing countries during the 1950s and 1960s. They both argued in favour of liberalising financial markets on the grounds that this would lead to more as well as more efficient investment which, in turn, would lead to higher economic growth rates. In the 1990s, when the role of financial institutions in economic growth became intensively discussed in the literature, several authors explicitly modelled the relationship between finance

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<sup>3</sup> See Berthélemy and Varoudakis (1996) and Levine (1997) for comprehensive reviews of the relationship between finance and growth.

<sup>4</sup> For more comprehensive reviews of the debate see Anderson and Tarp (2003), Fry (1997), Gibson and Tsakalatos (1994) and Singh (1997)

<sup>5</sup> In fact, empirical studies on the effects of financial liberalisation use different measures of this phenomenon, which indicate that there are different views of what captures financial liberalisation. In the meta-analysis, the issue of measurement of is explicitly taken into account.



and growth, while others focused on investigating the empirical support for these models.

The following arguments have been raised to support the positive relationship between financial liberalisation of both credit (i.e. banking) and capital markets vis-à-vis economic growth. First, it is claimed that introducing market principles and competition in banking markets increases interest rates on deposits, which leads to higher saving rates. This, in turn, increases the amount of resources available for investment (McKinnon 1973). If financial liberalisation includes opening up the capital account, capital inflows (in terms of both credit and equity investment) may increase, again raising the availability of funds for investment and growth. In both cases financing constraints of firms are reduced and investment will rise, leading to higher growth.

Second, competition puts pressure on profit margins of banks, in particular on the interest rates demanded for loans. This reduces the cost of debt, leading to a rise in investment and growth. Moreover, financial liberalisation increases possibilities of risk diversification for financial institutions such as banks, as well as for (international) equity investors. The subsequent reduction in loan rates and equity costs leads to a rise in investment and growth. Again, this argument would support the idea that financial liberalisation reduces financial constraints of firms, which ultimately increases macroeconomic growth.

Third, if banking markets are liberalised, banks are stimulated to become more efficient by reducing overhead costs, improving on overall bank management, improving risk management, and offering new financial instruments and services to the market to keep up with competitors. Moreover, if financial liberalisation means opening up domestic markets to foreign competition, this may lead to the import of bank and risk management techniques together with new financial instruments and services. All these effects will help to improve the efficiency of financial intermediation in a country, contributing to higher returns to investment and thus to higher rates of economic growth.

In contrast, it has also been argued that financial liberalisation has led in many cases to disappointing results and in some cases even to economic and financial crises. First, Stiglitz (2000) and others have pointed out that financial liberalisation as such does not solve the problem of asymmetric information. This may prevent financial intermediation from becoming more efficient in a liberalised market. Many papers, among them the seminal contribution of Stiglitz and Weiss (1981), have indeed shown that problems of asymmetric information prevail in financial markets and that therefore financial repression may arise even without government intervention.

Second, some papers make the point that financial liberalisation may actually aggravate information problems. When financial markets become liberalised and competition is increased, this may lead to a reduction of relationship lending, more opportunities may be open to borrowers and they will look for the cheapest way of financing their investment. However, a reduction of relationship lending also destroys information capital and thereby increases asymmetric information (Boot 2000).

Third, more competition in financial markets may also imply a reduction in profit margins and an increased financial fragility of financial intermediaries such as banks. Hellmann et al. (1996, 1997, 2000) in a series of articles make the point that liberalisation reduces the franchise value of banks, which makes them more prone to financial disruption and stimulates risk taking in order to try to increase profits under the pressure of falling interest rate margins. Reduced margins may

also stimulate banks to economise on screening and monitoring efforts, and they may be more willing to opt for a gambling strategy when allocating loans, i.e. putting less emphasis on risk and more on profit. Thus, financial liberalisation may trigger crises if it leads to excessive risk taking under the pressure of increased competition (Demirgüç-Kunt and Detragiache 1998).

Finally, increased risk taking in financial markets and the consequent increase in the number of failures of banks and other institutions may in itself trigger bank runs (Diamond and Dybvig 1983). Bank runs are another source of financial instability, even in a situation where some banks may be economically viable.

One way to curb the adverse effects of financial liberalisation on the stability of the financial system is to install financial market regulations. Such regulations should reduce risk taking by banks and should, at least to some extent, bail out depositors when their bank goes bankrupt. Such a deposit insurance system aims to reduce the probability of bank runs taking place in times of financial distress. This is why financial liberalisation in combination with a weak regulatory structure may have strongly adverse effects on growth (Andersen and Tarp 2003). Examples of this abound: Chile and Argentina in the early 1980s experienced the negative effects of financial liberalisation. The same holds for Mexico (in 1994-95) and the countries affected by the Asian crisis (1997-98), to name just a few. Also the global financial crisis of 2007-08 was triggered by, among other things, insufficient financial market regulation.

The above short discussion shows that, from a theoretical perspective, the nature of the relationship between financial liberalisation and economic growth is ambiguous. Given this theoretical ambiguity, it is important to investigate from an empirical point of view whether or not financial liberalisation leads to higher economic growth. Several papers have looked into this issue. The general picture that emerges from the empirical literature is that the empirical evidence is inconclusive. Yet, studies reviewing the empirical evidence provide a narrative discussion of the financial liberalisation-economic growth relationship. They do not attempt to systematically review the empirical evidence, for example, by using meta-regression analysis.

The purpose of this study is to shed light on the nature of the relationship between financial liberalisation and economic growth using the meta-analysis framework, based on a sample of 60 empirical studies. We investigate the determinants of the heterogeneity of the results found in our sample of empirical studies. These determinants consist of several study specific characteristics, as well as a number of contextual variables, specifying the context in which policies have been carried out. We are not aware of any meta-analytical review of the financial liberalisation-growth nexus.

In particular, we address the following research question (i) and sub-questions (ii-vi):

- i) Is the relationship between financial liberalisation and economic growth positive or negative?
- ii) Does the sign of this relationship differ for different types of measures of financial liberalisation?
- iii) Does the sign of the relationship differ for developed versus developing countries?
- iv) Does the sign of the relationship between financial liberalisation and growth differ for different time periods?
- v) Are findings about the relationship different for different types of studies (i.e. published versus working papers) and methods of analysis

## 2. *Financial liberalisation and economic growth: the debate*

(i.e. panel, fixed effects, controlling for endogeneity, etc.) used in the studies in our sample?

- vi) Is the context in which financial liberalisation is carried out important for the nature of the relationship between financial liberalisation and economic growth?

### 3. Measuring financial liberalisation

The literature distinguishes three broad categories of measures, namely capital account liberalisation, equity market liberalisation and banking sector liberalisation. In addition, there are multidimensional measures which combine aspects of the above categories. In general, authors rely on capital account measures as proxies for financial liberalisation. Measures of the other categories are used less frequently. Table 3.1 summarises important liberalisation measures on the basis of the different categories. As can be seen from the table, capital account liberalisation can be divided into two subcategories. On the one hand, so called *de jure* measures reflect the existence of legal restrictions on international capital transactions. Typically, these measures involve scoring methods where each increment means a lowering of restrictions. Many of these measures use information from the Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) of the International Monetary Fund (IMF). On the other hand, *de facto* measures refer to actual flows and stocks of capital. The former comprise different types of capital such as FDI (foreign direct investment) plus portfolio flows or total capital flows (see, e.g., Edison et al. 2002). Kose et al. (2006b) as well as Prasad et al. (2003) advocate the adoption of the related stock data, such as foreign assets and liabilities. The authors point out that stocks are less volatile and less vulnerable to measurement error. In light of this, many studies use the database on gross foreign assets and liabilities which was compiled by Lane and Milesi-Ferretti (2001).

Edison et al. (2004) show that for developed countries *de jure* measures and *de facto* measures (i.e. those based on the estimated stocks of gross foreign assets and liabilities as a ratio of GDP [gross domestic product]) follow very similar patterns over time. For the case of developing countries the picture is less straightforward. While both *de jure* and *de facto* liberalisation seemed to stagnate at low levels until the mid-1980s, they appear to diverge in more recent decades, with *de facto* measures pointing towards an acceleration of liberalisation, whereas *de jure* liberalisation has reverted back to its level of the early 1970s.

Both *de facto* and *de jure* measures of capital account liberalisation have specific shortcomings. An often cited criticism with respect to *de jure* measures is that they are silent about the intensity of capital account openness. This problem is most obvious in case of the *IMF\_AREAER* binary indicator which becomes 1 if a country has no legal capital restrictions in place and 0 otherwise. For instance, it is possible that countries with an assigned value of 0 can in practice enforce capital controls in different ways leading to diverse outcomes in terms of flows (Kose et al. 2006a, 2006b). In view of this criticism, more nuanced or disaggregated measures such as the *Quinn* measure or *OPENNESS* were developed. Nonetheless, these measures preserve the dummy variable nature of the original *IMF\_AREAER* measure (Quinn and Toyoda 2008). By virtue of this limitation, *de facto* measures are considered as an adequate alternative (Kose et al. 2006b, Prasad et al. 2003). Nevertheless, there are a number of potential problems with *de facto* measures. Some authors suggest that these measures are potentially endogenous in growth regressions. In addition, capital flows might be driven by factors other than capital account openness policies such as reforms in other areas of the economy (Kose et al. 2006b, Quinn and Toyoda 2008). The last point also implies that *de facto* liberalisation is not necessarily consistent with what we actually would like to capture, namely the link between exogenous political changes in capital account restrictions and economic growth. However, the endogeneity problem also applies to the *de jure*

measures of capital account liberalisation. For example, fast growing countries may decide to remove restrictions on capital movements to push economic growth further, leading to a stronger correlation between liberalisation and growth.

Apart from capital account liberalisation, several studies investigate the impact of equity market liberalisation using measures of restrictions on the international sale or purchase of equities. As shown in Table 3.1, there are different approaches to measuring equity market liberalisation. The traditional measure is *official liberalisation* which aims at determining the time period in which the liberalisation of equity markets to foreign investors occurred (Bekaert and Harvey 2000). Several authors have extended this indicator by combining different sources and including additional countries (i.e. Bekaert and Harvey 2000, Bekaert et al. 2005, Kaminsky and Schmukler 2003).

The third category of measures focuses on the liberalisation of the banking sector. In general, these measures are concerned with the liberalisation of the interest rate. However, compared with the other two categories, bank-based measures are rarely employed.

Finally, we identify a fourth group consisting of measures that cannot be incorporated into one of the above categories. Often, these measures combine several dimensions of financial liberalisation. A prominent example is based on the work by Abiad and Mody (2005) and Abiad et al. (2010) who take into account six dimensions of financial market policies.

The endogeneity problem discussed above also applies to measures of equity market and banking sector liberalisation as well as multidimensional measures. Abiad and Mody (2005), using their multi-dimensional measure of financial liberalisation, suggest that financial liberalisation is positively associated with global interest rate declines, balance of payments crises and greater openness to trade, whereas banking crises seem to have been associated with reversals of reforms. Huang (2009) criticises Abiad and Mody (2005). Using different econometric methods and additional data, Huang (2009) shows that efforts to implement financial liberalisation by countries depend on the extent to which they have financially repressed financial systems. Moreover, he shows that a country's economic and political structure and ideology have an impact on decisions to implement reforms. Thus, both studies indicate that the decision to liberalise financial markets may not be independent from other (economic or political) factors. Hence, their evidence implies that endogeneity may be a problem when implementing the liberalisation measures.

**Table 3.1:** Measures of financial liberalisation

A. Capital account liberalisation	
<b>A.1 <i>de jure</i> measures</b>	
IMF_AEAER	<ul style="list-style-type: none"> <li>▪ binary variable to indicate countries with an open capital account</li> <li>▪ comprises six categories</li> <li>▪ takes a value of 0 if the country in question has at least one restriction in the '<i>restrictions on payments for the capital account transactions</i>', 1 otherwise</li> </ul>

Quinn (1997)	<ul style="list-style-type: none"> <li>▪ liberalisation scale ranging between 0 and 4 with increments of 0.5 points</li> <li>▪ higher values indicate lower intensity of financial regulation</li> <li>▪ based on AREAER data</li> </ul>
OPENNESS	<ul style="list-style-type: none"> <li>▪ liberalisation scales with increments of 0.5 points</li> <li>▪ ranges between 0 and 14</li> <li>▪ based on AREAER data</li> </ul>
KAOPEN	<ul style="list-style-type: none"> <li>▪ index to measure the extent of capital account openness</li> <li>▪ based on the four main categories of the restrictions on external accounts reported in the AREAER</li> </ul>
Number of years with controls SHARE	<ul style="list-style-type: none"> <li>▪ ratio between number of years without controls on capital flows divided by total number of years in the sample, values between 0 and 1</li> <li>▪ based on AERAER data</li> </ul>
<b>A.2 De Facto measures</b>	<ul style="list-style-type: none"> <li>▪ types: FDI plus portfolio in- and out-flows, foreign assets plus foreign liabilities, stock of FDI plus portfolio flows</li> <li>▪ measured as a fraction of GDP</li> </ul>
<b>B. Equity market liberalisation</b>	
Official liberalisation	<ul style="list-style-type: none"> <li>▪ corresponds to a date of formal regulatory change after which foreign investors officially have the opportunity to invest in domestic equity securities</li> <li>▪ constructed as a share of years liberalised</li> </ul>
First sign	<ul style="list-style-type: none"> <li>▪ denotes the year associated with the earliest of three dates: official liberalisation, first American depositary receipt (ADR) announcement and first country fund launch</li> <li>▪ takes a value of 1 after the first sign year, 0 otherwise</li> </ul>
International Financial Corporation (IFC)	<ul style="list-style-type: none"> <li>▪ index on stock market liberalisation capturing two regimes: a liberalisation and restricted regime</li> </ul>

*(continued)*

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**C. Banking sector liberalisation**

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- Kaminsky and Schmukler (2003)
- chronology of bank liberalisation taking into account regulations on deposit interest rates, lending interest rates, allocation of credit, foreign currency deposits
  - distinguishes the degree of openness: repressed, partially liberalised, fully liberalised
- 

- Demirgüç-Kunt and Detragiache (1998)
- dates of domestic interest rate liberalisation
- 

**D. Multidimensional measures**

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- Abiad et al. (2010)
- measure that considers six dimensions of financial market policies: i) credit controls; ii) interest rate controls; iii) entry barriers; iv) operational restrictions for securities markets; v) privatisation of financial institutions; vi) restrictions on international financial transactions
- 
-

## **4. Meta-analysis**

Meta-analysis is a statistical technique to quantitatively synthesise the empirical evidence of a specific field of research. In this study, we look at the relationship between financial liberalisation and economic growth. Meta-analysis is conducted most prominently in medical sciences. However, it has also become an increasingly accepted research tool in economics since it is proving to be very useful for policy evaluations (Pang et al. 1999, Stanley 2001).

As discussed in section 2, the impact of financial liberalisation on economic growth has sparked controversy and, therefore, has received considerable coverage over the years. This is reflected in the number of empirical studies that deal with the different dimensions of financial liberalisation and their impact on various aspects of economic development. The extensive empirical literature on this issue rationalises the usage of meta-analytical tools to clear the picture.

Figure 4.1 provides an overview of the different steps involved in our meta-analysis.<sup>6</sup> In step 1 we describe our literature retrieval process. This step is crucial to the quality and conclusiveness of the meta-analysis. Only a comprehensive dataset makes it possible to deliver a valid summary of previously established results. We break up the literature retrieval process into two substeps. The first part consists of defining eligibility criteria for the inclusion of relevant studies. The second part involves a systematic search process. In step 2, we discuss the measure of the liberalisation-growth relationship used in our analysis. Choosing a measure that is comparable across studies is important in order to be able to carry out a meaningful meta-analysis. In step 3, we provide a detailed description of our dataset. The aim is to familiarise the reader with the data and give an overview of the problem to be studied before delving into the deeper analysis on the basis of hypothesis testing. The objectives of step 4 are twofold. First, we intend to examine the sources of heterogeneity in the study results by means of meta-regression analysis. Second, we explore whether the existing literature is biased towards a significantly positive correlation between financial liberalisation policies and economic growth (i.e. we investigate whether our data suffer from a possible publication bias).

### **4.1 Literature retrieval process**

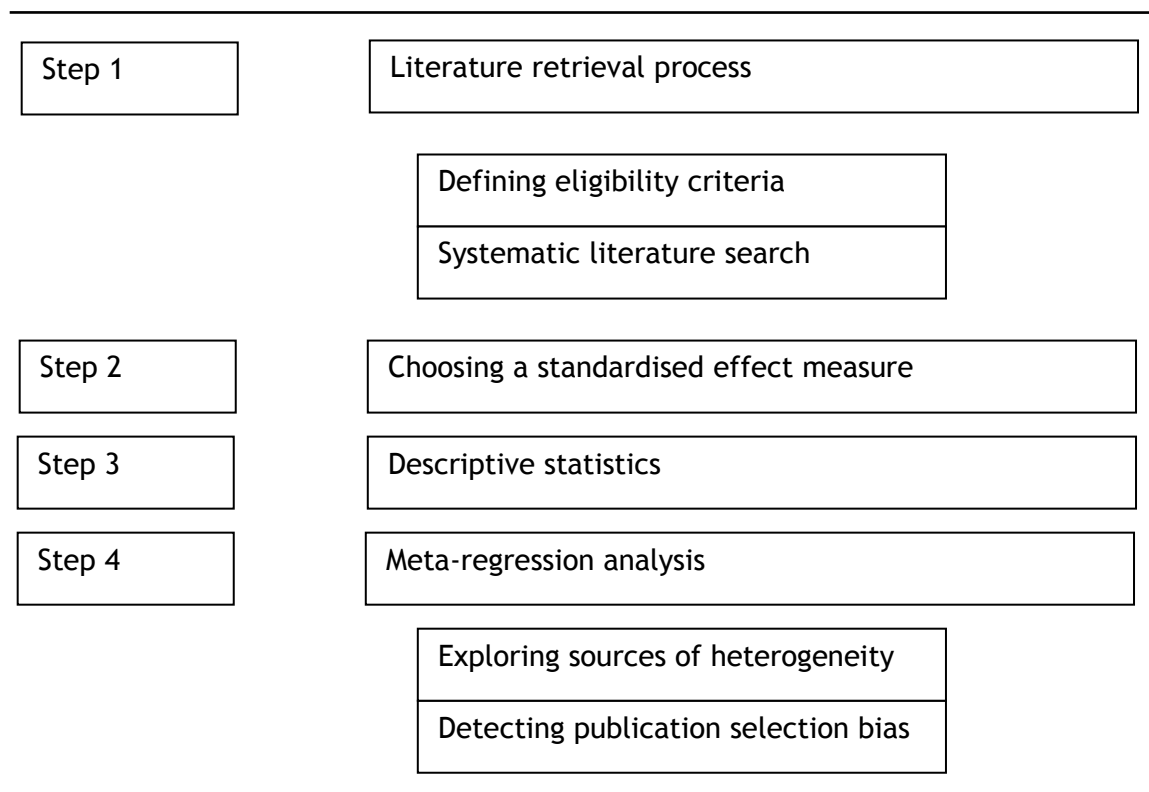
Financial liberalisation has been investigated from many different perspectives resulting in a large variety of research questions and methodologies. For instance, the term financial liberalisation yields 264,000 findings on Google Scholar.<sup>7</sup> Thus, in order to conduct a meaningful meta-analysis, we defined criteria to separate relevant studies from the large amount of literature. Accordingly, we chose to include studies that:

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<sup>6</sup> The individual steps will be more carefully explained and results obtained in subsequent sections.

<sup>7</sup> This outcome is based on a search in May 2011.



**Figure 4.1:** Overview of the meta-analytical framework

Take economic growth as the dependent variable and some measure of financial liberalisation as the independent variable;

- i) Investigate either a cross-section or a panel of countries;
- ii) Provide sufficient statistical information - especially on the coefficient and the corresponding t-statistic or standard error of the financial liberalisation variable;
- iii) Examine the liberalisation-growth nexus in terms of a multivariate regression model;
- iv) Are written in English language; and
- v) Were published after 1990 in books, journals or as a working paper.

Excluded studies often did not examine the liberalisation growth nexus in a cross-country setting or did not have economic growth as the dependent variable. A few studies had to be disregarded due to insufficient statistical information.

We started our search for relevant publications by querying the electronic database consisting of RePEc<sup>9</sup> (Research Papers in Economics) pairing the words 'cross-country' and 'growth' with 'banking reform', 'banking deregulation', 'banking liberalization/ liberalisation', 'capital account liberalization/ liberalisation' or 'equity market liberalization/liberalisation'. RePEc served as our primary database.<sup>10</sup> This search resulted in 1,256 papers that encompassed a

<sup>9</sup> RePEc is a database that comprises the largest electronic collection of working papers and journal articles in economics. The database was queried in September 2010.

<sup>10</sup> In the systematic review protocol, we mentioned the possibility of looking at the links between financial liberalisation policies and savings, investments and financial sector

diverse spectrum of hypotheses and empirical approaches. By reading the title or abstract and skimming the text, we were able to identify 41 relevant studies. The same identification strategy was used when we searched for relevant publications in three additional electronic databases, i.e. SSRN (Social Science Research Network), JSTOR and Google Scholar. These are three large databases, which helped us backing up our findings.<sup>11</sup> This search led to 359 results from which 16 additional studies were included. We then searched in the databases of the World Bank and International Monetary Fund, which yielded two additional studies.<sup>12</sup>

After having reviewed the above-mentioned databases, we checked important journals in the field of financial liberalisation for recent publications. In particular, we went through all issues from January 1990 to March 2011 of the *Review of Financial Studies*, *Journal of Finance*, *Journal of Financial Economics*, *Review of Financial Studies*, *Journal of International Money and Finance*, *Journal of Development Studies*, *Journal of Development Economics* and *World Bank Economic Review*. Finally, we verified that we had not overlooked empirical studies by scanning the references of well-recognised literature surveys that deal with the link between financial liberalisation and economic growth, for instance Eichengreen (2001), Henry (2003, 2007) and Kose et al. (2006). The last two sources (journals and survey articles) yielded one further study.

The literature search and the exclusion review were undertaken by two independent researchers, one of whom is an author of this study. Based on the systematic search and our inclusion criteria (points (i) to (vi)), we ended up with a set of 60 studies.<sup>13</sup> Figure 4.2 summarises the steps involved in the process. To support the accuracy of our results, the search and coding were carried out by two independent researchers. Table A4.1 in Appendix 4.1 lists all the studies which we include in the meta-analysis.

## 4.2 Choosing a standardised effect measure

Throughout the following sections we consider the t-statistic of the financial liberalisation coefficient (with economic growth as the dependent variable) as a standardised effect size which is subjected to a meta-analysis. This decision is mainly motivated by the fact that the t-statistic is a dimensionless variable. Using the financial liberalisation coefficient itself is not appropriate owing to the different financial liberalisation measures employed across studies.<sup>14</sup>

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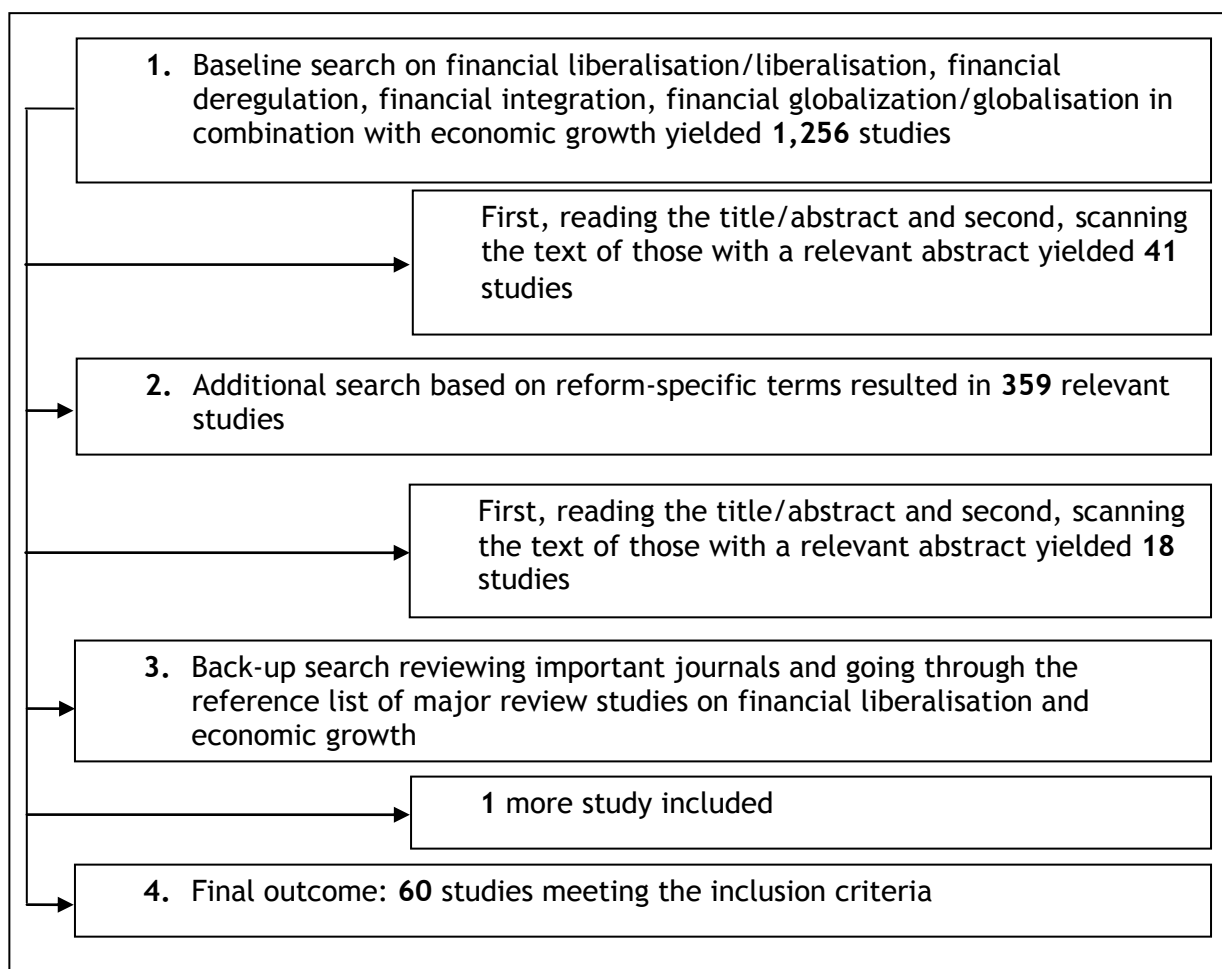
performance. However, due to the relatively large amount of empirical evidence on the relationship between financial liberalisation and growth, and the lack of studies on the relationship between financial liberalisation and other macroeconomic variables, we decided to concentrate on the literature investigating the financial-liberalisation-economic-growth nexus.

<sup>11</sup> SSRN was queried in November 2010, JSTOR was queried in September 2010 and April 2011, and Google Scholar was queried in November 2010.

<sup>12</sup> The databases of the World Bank and the International Monetary Fund were queried in July 2012.

<sup>13</sup> We completed our literature search on 12 April 2011.

<sup>14</sup> Ideally, we would like to use the simple or partial correlation and/or the elasticity between financial liberalisation and economic growth, because this would allow us to identify the magnitude of the relationship between the two (Doucouliagos and Ulubaşoğlu 2008). Unfortunately, the information provided in the studies in our dataset is not sufficient to calculate standardized correlations and/or elasticities. Based on the t-statistic we use, it

**Figure 4.2:** Literature search and retrieval process

From our 60 identified studies we collected 441 t-statistics. Each individual t-statistic relates to the effect size of the financial liberalisation variable in a particular model specification. One study may present the results of one or more model specifications. Given that our sample consists of 60 studies, the average number of model specifications per study is 7.4.<sup>16</sup> We only included the t-statistics from the main regressions of a study. Thus, we did not consider those of robustness checks. Arguably, including the results of robustness checks could lead to bias since not all authors report their outcomes if they do not support their central findings. We inferred the main regressions from the explanations in the text. Phrases such as ‘...to verify the robustness of our results...’ and ‘... section [...] considers several

is not possible to draw conclusions about the magnitude of the financial liberalisation coefficient since a change in the size of the t-statistic can increase if either the coefficient is higher or the standard deviation is smaller. It does allow us, however, to draw conclusions on whether the relationship between financial liberalisation and economic growth is found to be positive or negative and whether or not this relationship is statistically significant. With respect to interpreting the value of the t-statistics reported, We would like to make clear that a t-statistic that is smaller than 1.96 in magnitude - regardless of the direction of the effect - is considered to be not statistically significant at  $\alpha = 0.05$ .

<sup>16</sup> Usually, in econometric modelling it is important to estimate different specifications of the model to control for omitted variables bias.

robustness exercises...’ helped us to separate the main regressions from the ones that are included for robustness checks purposes.

### 4.3 Descriptive statistics

Table 4.1 and Figure 4.3 present descriptive statistics of the studies included in our meta-sample. According to the table, the majority of studies report multiple estimates of the financial liberalisation coefficient. Two important facts emerge from Figure 4.3. First, the t-statistic varies over a considerable range of values across studies (the largest negative value is -12, whereas the largest positive value is 25). Second, the t-statistics seem to be widely dispersed.

Table 4.2 presents descriptive statistics of our meta-sample by publication year. As can be seen from the table, there are only a few publications in the 1990s with an average number of publications of approximately one per year. In contrast, in the period 2000 to 2010 the average annual number of publications is five. As a result of variation in publications per year in our sample, a large fraction of t-statistics originate from studies that were published in the years 2001, 2003, 2004 and 2008. Overall, the number of positive and significant results appears to be correlated with the number of publications in journals. The fact that 2008 is the year with most publications suggests that the link between financial liberalisation and economic growth is still a highly relevant and unsettled issue. The table further shows the time coverage of all studies in our sample. Most studies cover at least the 1970s, 1980s and 1990s. One study uses historical data going back as far as 1880; the most recent data are from 2005. The average number of control variables ranges between 3.6 and 6.3. The observation that studies use different numbers of controls is relevant to the general criticism that Barro-type growth regressions allow for various model specifications and do not deliver accurate insights into the liberalisation-growth relationship due to their lack of sufficient theoretical underpinnings (i.e. Levine and Renelt 1992, Sala-i-Martin 1997). In section 4, we will explore the role of the different control variables in accounting for the variation in the t-statistic across studies.

**Table 4.1:** Mean, minimum and maximum t-statistics from each study

#	Study	N	Min.	Mean	Max.	min_year	max_year
1	Achy (2004)	1	0.17	0.17	0.17	1970	1998
2	Arteta (2001)	26	-2.47	1.02	2.6	1973	1992
3	Bailliu (2000)	3	-2.64	-2.09	-1.82	1975	1995
4	Bekaert (2001)	1	3.29	3.29	3.29	1980	1997
5	Bekaert (2003)	3	4.91	5.72	6.39	1980	2002
6	Bekaert (2005)	23	0.59	4.18	6.38	1980	1997
7	Ben Gmra (2009)	9	-3.2	0.26	3.38	1980	2002
8	Ben Naceur (2008)	6	-2.11	-0.68	1	1979	2005
9	Bonfiglioli (2004)	11	0.61	1.48	2.17	1975	1999
10	Bordo (2007)	8	-0.45	1.33	2.73	1880	1913
11	Bussière (2008)	5	1.14	1.74	2.63	1980	2002
12	Butkiewicz (2008)	16	-1.75	1.46	6.92	1970	1997

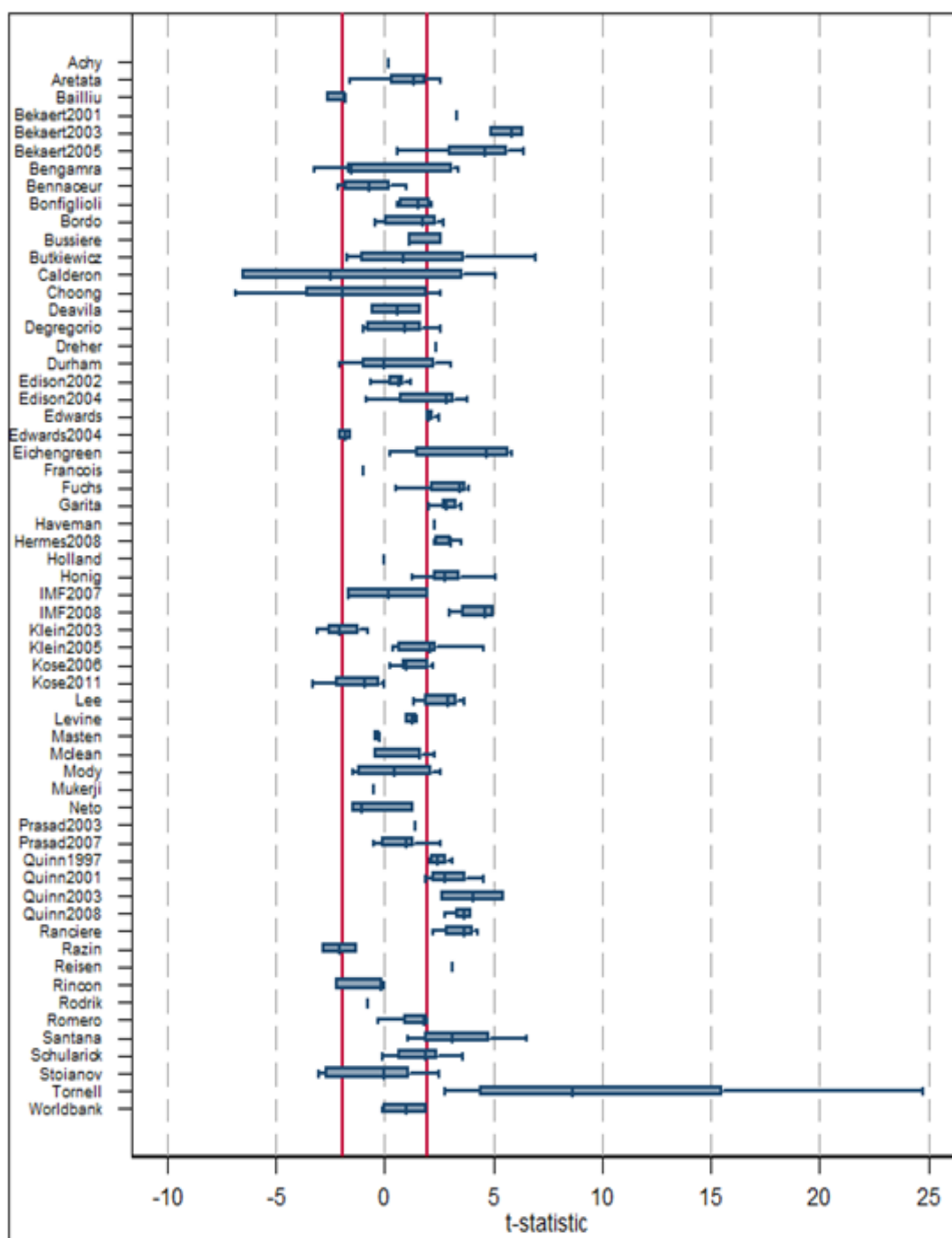
13	Calderon (2005)	5	-6.5	-1.36	5.1	1960	2000
14	Choong (2010)	16	-6.84	-1.5	2.58	1988	2002
15	De Avila Torrijos (2003)	2	-0.54	0.57	1.69	1960	2001
16	De Gregorio (1998)	6	-0.95	0.74	2.57	1976	1993
17	Dreher (2006)	2	2.37	2.39	2.4	1970	2000
18	Durham (2004)	8	-2.1	0.45	3.05	1979	1998
19	Edison (2002)	17	-0.91	0.64	2.46	1976	2000
20	Edison (2004)	13	-0.81	2.01	3.82	1970	1995
21	Edwards (2001)	7	1.26	2.02	2.48	1975	1997
22	Edwards (2004)	2	-2.09	-1.82	-1.54	1970	2001
23	Eichengreen (2003)	11	0.28	3.92	5.83	1880	1997
24	Francois (1999)	1	-0.98	-0.98	-0.98	1986	1995
25	Fuchs -Schendeln (2004)	12	0.51	2.89	3.88	1975	2000
26	Garita (2009)	10	2	2.95	3.55	1970	2005
27	Haveman (2001)	1	2.33	2.33	2.33	1970	1989
28	Hermes (2008)	6	2.32	2.9	3.55	1973	1996
29	Holland (2005)	2	-0.01	0.001	0.01	1972	2000
30	Honig (2008)	30	0.43	2.85	5.4	1970	2005
31	IMF (2007)	2	-1.64	0.18	2	1975	2004
32	IMF (2008)	4	3	4.3	5	1960	2005
33	Klein (2003)	8	-3.11	-1.94	-0.8	1976	1995
34	Klein (2005)	5	0.42	2.01	4.53	1976	1995
35	Kose (2006)	7	0.27	1.28	2.25	1960	2000
36	Kose (2011)	21	-3.27	-1.24	0	1975	2004
37	Lee (2008)	5	1.36	2.63	3.67	1980	1999
38	Levine (1998)	2	1.01	1.26	1.51	1976	1993
39	Masten (2008)	3	-0.4	-0.27	-0.2	1996	2004
40	McLean (2002)	5	-0.43	0.96	2.31	1976	1995
41	Mody (2007)	4	-1.45	0.51	2.57	1975	2004
42	Mukerji (2009)	2	-0.52	-0.51	-0.5	1960	1999
43	Neto (2008)	3	-1.45	-0.4	1.31	1970	2004
44	Prasad (2003)	1	1.42	1.42	1.42	1982	1997
45	Prasad (2007)	9	-0.48	0.86	2.58	1970	2004
46	Quinn(1997)	8	1.07	2.4	3.09	1958	1989
47	Quinn (2001)	4	1.87	2.99	4.56	1950	1997

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48	Quinn (2003)	2	2.67	4.08	5.5	1890	1999
49	Quinn (2008)	13	2.77	3.83	5.29	1955	2004
50	Ranciere (2006)	4	2.22	3.46	4.26	1980	2002
51	Razin (2004)	2	-2.83	-2.05	-1.28	1970	1997
52	Reisen (2001)	1	3.13	3.13	3.13	1986	1997
53	Rincon (2007)	6	-12	-2.42	0	1984	2003
54	Rodrik (2009)	2	-0.8	-0.77	-0.74	1970	2004
55	Romero-Avilo (2009)	9	-0.31	1.72	4.25	1960	2001
56	Santana (2004)	12	1.1	3.4	6.56	1970	2000
57	Schularick (2006)	12	-0.06	1.75	3.6	1880	2002
58	Stoianov (2008)	11	-3	-0.27	2.49	1996	2005
59	Tornell (2004)	7	2.8	10.79	24.77	1980	1999
60	Worldbank (2001)	4	-0.1	0.98	1.96	1970	1998

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Notes: N refers to the number of t-statistics extracted from each individual study; min\_year indicates the earliest year and max\_year the most recent year of the dataset which is subjected to a regression analysis.

**Figure 4.3:** Box plot by study

*Notes:* The lower and the upper hinge of the box denote the 25<sup>th</sup> and 75<sup>th</sup> percentile of the t-statistic in a study respectively. The band inside the box indicates the median. The whiskers represent the largest and smallest t-statistic, respectively. The red lines at -1.96 and +1.96 indicate the critical t-values when  $\alpha = 0.05$ ; t-values greater than 1.96 in absolute terms are considered to indicate a statistically significant relationship between financial liberalisation and economic growth.

Figure 4.4 displays the frequency distribution of the t-statistic. The main message of this figure is that a considerable number of t-statistics lie inside the region between the two red lines indicating insignificance. As reported in Table 4.3, 194 t-statistics (i.e. 44 percent of the total sample of t-statistics) are smaller than 1.96 in absolute terms. Apart from this, there are a few values that can be regarded as outliers.

Table 4.4 offers a more detailed overview of the average t-statistics in our sample by type of financial liberalisation measure and group of countries for different time periods. At first glance, the table indicates that the coverage in terms of time periods and country groups differs across measures. More precisely, the dataset does not allow us to report t-statistics for all country groups and time periods. Moreover, the distribution of t-statistics in terms of magnitude is rather heterogeneous, although the sign is positive in most cases. The unweighted average value of the 441 t-statistics is 1.6<sup>17</sup> implying that, overall, there does not seem to exist a statistically significant relationship between financial liberalisation and economic growth. A closer look at the table reveals that studies using data from developed countries (*oecd*) exhibit a strong tendency to report statistically significant and positive liberalisation coefficients for capital account liberalisation. Studies combining both developing and developed countries in their sample (*mixed*) find that financial liberalisation is positively associated with economic growth when measures referring to *de jure* capital account liberalisation and equity market liberalisation are used. However, when measures of *de facto* capital account liberalisation are considered, the findings are less optimistic. With respect to developing countries (*dc*), the results are also mixed. Studies focusing on this set of countries do not generally report positive significant liberalisation coefficients, except those studies employing bank-based measures of financial liberalisation. In addition, for these countries *de jure* capital account liberalisation appears to be positively related to economic growth until the 1960s. However, this relationship turns negative over the subsequent decades.

Finally, Table 4.4 shows that there are no studies that consider equity measures in developed countries; only one study considers bank measures in the mixed country group. We note that the results relating to the bank-based and other measures must be interpreted with caution, since only a few studies are based on these measures. Three main lessons can be drawn from Table 4.4. First, studies that combine developed and developing countries report the highest t-statistics on average. Second, capital account measures indicate trend reversals with respect to the significance of the financial liberalisation-growth nexus. Third, studies generally do not find significant growth-enhancing effects of financial liberalisation in developing countries.

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<sup>17</sup> The weighted average (using the inverse of the number of t-statistics for each study as our weight) is 1.39.

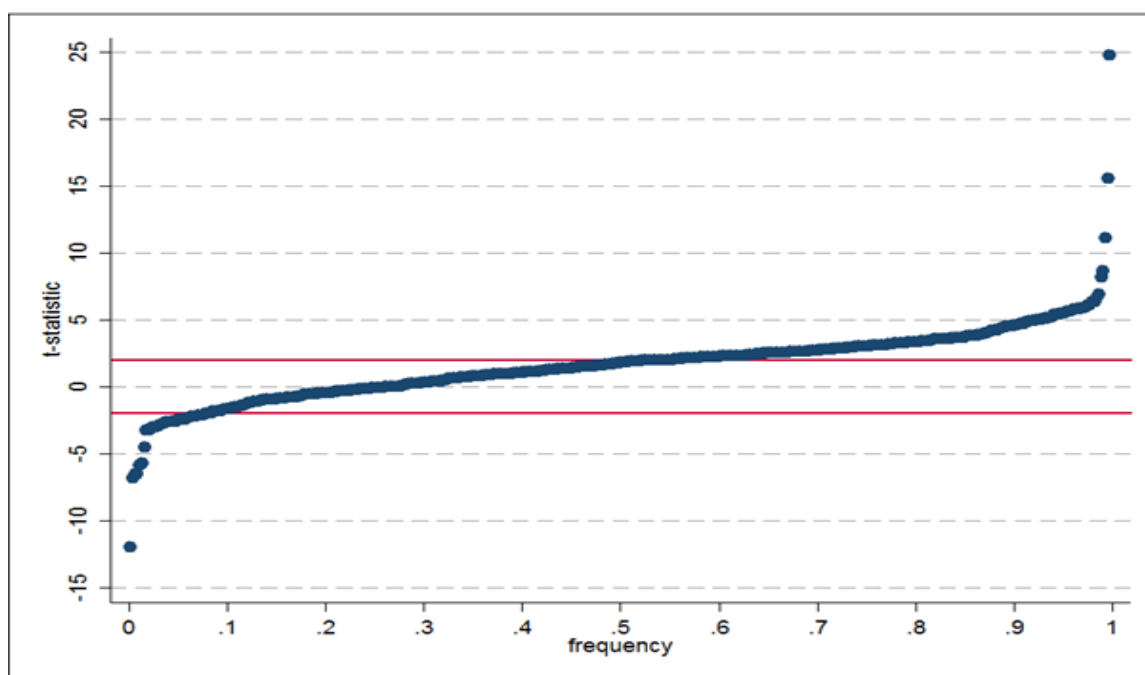


**Table 4.2:** Study characteristics by publication year

	No. of publications	No. of estimates		Average no. of controls	t-statistic		
		WP <sup>a</sup>	Journal		sig. <sup>b</sup> negative	insig.	sig. positive
1997	1	0	8	6.3	0	1	7
1998	2	6	2	4.8	0	7	1
1999	1	1	0	5.0	0	1	0
2000	1	3	0	6.3	1	2	0
2001	6	41	2	4.1	1	25	17
2002	3	5	18	4.4	0	18	5
2003	6	11	16	3.6	4	10	13
2004	8	35	32	4.6	3	23	41
2005	5	11	25	5.4	3	9	24
2006	4	12	13	5.2	0	11	14
2007	4	30	0	6.1	2	18	9
2008	10	24	78	4.7	4	38	60
2009	5	12	20	4.2	2	14	16
2010	1	0	16	4.5	7	4	5
2011	1	0	21	5.6	8	13	0
					∑ 35	∑ 194	∑ 212

Notes: <sup>a</sup> WP = working paper; <sup>b</sup> sig. = significant.

**Figure 4.4:** Frequency distribution of the t-statistic



*Note:* The red lines at -1.96 and +1.96 indicate the critical t-values when the probability level equals 5%; t-values greater than 1.96 in absolute terms are considered to indicate a statistically significant relationship between financial liberalisation and economic growth.

**Table 4.3:** Average t-statistics for different time periods, country groups and measures

	Capital account liberalisation						Bank		
	<i>de jure</i>			<i>de facto</i>			OECD	DC	Mixed
	OECD <sup>a</sup>	DC <sup>b</sup>	Mixed <sup>c</sup>	OECD	DC	Mixed	OECD	DC	Mixed
Before 1960	4.08	2.42	3.47	1.48	-	2.00	-	-	-
1960s	2.72	2.42	2.93	-	-	-0.70	-0.27	-	4.18
1970s	1.93	1.55	1.85	2.54	0.68	0.81	-0.27	-	4.18
1980s	1.93	0.87	1.67	1.67	0.87	1.10	-0.27	3.24	4.18
1990s	1.93	0.87	1.69	0.63	0.92	1.09	-0.27	3.24	4.18
2000s	1.96	-1.96	2.22	0.49	0.97	-0.29	-0.27	3.24	4.18
No. of obs. <sup>d</sup>	14	13	146	29	44	101	3	4	1

*(continued)*

Table 4.3, *continued*.

	Equity			Multidimensional		
	OECD	DC	Mixed	OECD	DC	Mixed
<b>Before 1960</b>	-	-	-	-	-	-
<b>1960s</b>	-	-	1.74	<b>2.40</b>	-	<b>4.33</b>
<b>1970s</b>	-	1.11	<b>2.37</b>	<b>2.40</b>	0.17	2.72
<b>1980s</b>	-	1.34	<b>3.15</b>	<b>2.40</b>	0.17	2.28
<b>1990s</b>	-	1.34	<b>3.15</b>	<b>2.40</b>	0.17	2.28
<b>2000s</b>	-	0.31	3.05	<b>2.40</b>	-	3.25
<b>No. of obs.<sup>d</sup></b>	0	18	55	4	1	8

Notes: Numbers in bold indicate significance at the 10% level.

<sup>a</sup> Studies investigating OECD or developed countries.

<sup>b</sup> Studies that look at developing countries (DC).

<sup>c</sup> Studies combining data for developed and developing countries.

<sup>d</sup> Number of observations (obs.) for the different types of measures by country group.

#### 4.4 Meta-regression analysis

In Step 3 of the preceding analysis, it was shown that the t-statistic varies considerably across the different types of measures, country groups as well as time periods. In this section, we investigate this heterogeneity more deeply by means of a meta-regression model. Our approach follows that of Doucouliagos and Stanley (2009).

Before proceeding, we want to make some remarks on the type of analysis we adopt. In the literature, there are two approaches to meta-regression analysis. On the one hand, there are studies that divide all variables in the meta-regression model by the standard error of the variable that is subject to meta-analysis in order to account for publication selection bias and to correct for heteroskedasticity (see, e.g., Doucouliagos 2005, Doucouliagos and Stanley 2009). Intuitively, due to this scaling, observations with large standard errors get a smaller weight in the estimation. In other words, dividing by the standard error controls for a non-random correlation between the coefficient and the standard error. On the other hand, authors such as Mookerjee (2006) and De Dominicis et al. (2008) are rather cautious about the importance of publication bias. As argued by De Dominicis et al. (2008), publication bias may be only one explanation for a correlation between the coefficient and the standard error. Moreover, an implicit requirement of the first approach is that the dimensions of the variables in the original studies are comparable. However, this is not the case in our sample as studies use different variables with different dimensions when measuring financial liberalisation.<sup>18</sup> Thus, we suggest that it is difficult to disentangle publication bias from dimensional effects. Therefore, we choose not to apply scaling of the variables by the standard errors. In a separate analysis, we will examine whether our data potentially suffer from publication bias by means of a funnel asymmetry test (Egger et al. 1997).

##### 4.4.1 Exploring sources of heterogeneity

We begin this section with some conceptual as well as notational remarks that apply to the remainder of the study. Our dataset consists of  $N$  studies, with a different number  $m$  of individual t-statistics  $t$  in each study. The total number of individual t-statistics is denoted

by  $M = \sum_j^N \sum_i^m t_{ij}$ . The  $j$ -index represents the studies ( $j = 1, \dots, N$ ), and the  $i$ -index stands for

the individual t-statistics within a certain study ( $i = 1, \dots, m$ ). Since we collect multiple t-statistics per study, our dataset can be interpreted in terms of a two-level structure: the t-statistics are located at the first level, whereas the studies correspond to the second level.<sup>19</sup> The estimated effects of financial liberalisation reported in the same study are expected to be dependent if an author has based their estimations on the same group of countries and/or the same time period. By estimating a random-effects model, we take account of this dependence structure through the exploitation of both between- and

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<sup>18</sup> Scaling by the standard errors would then have the strange result that observations measured in millions (which is the case for some of the *de facto* liberalisation measures) would at least potentially receive a much lower weight in the estimates compared to observations measured as a ratio (as is the case many of the *de jure* measures).

<sup>19</sup> Also notice that the idea of the hierarchical model is to explain the variation that occurs at level 1 (the lowest level). Therefore, the t-statistic has to vary at level 1 (Snijders and Bosker 2004).

within-study information.<sup>20</sup> Other meta-studies using this kind of framework include Doucouliagos (2005), Mookerjee (2006), De Dominicis et al. (2008) and Klomp and De Haan (2010).

The model to be estimated reads as follows:

$$\text{level 1: } t_{ij} = \beta_{1j} + \sum_l \beta_l X_{l,ij} + \sum_p \beta_p Z_{p,j} + e_{ij} \quad (1)$$

$$\text{level 2: } \text{with } \beta_{1j} = \pi_{00} + u_{0j},$$

where the dependent variable is the t-statistic,  $Z$  and  $X$  are vectors of conditioning variables explaining differences in the liberalisation effect within and between studies. Note that the variables in  $Z$  only vary at the study level (level 2), whereas those in  $X$  alternate at the observational level (level 1).  $\beta_{1j}$  is the intercept that varies between studies as indicated by the index  $j$ . It can be split into an average intercept,  $\pi_{00}$ , and a random study effect,  $u_{0j}$ . We assume that  $u_{0j}$  is independently and identically distributed with mean 0 and between-study variance  $\sigma_u^2$  (level 2).  $e_{ij} \sim N(0, \sigma_e^2)$  represents the usual error term.  $\sigma_e^2$  is also referred to as the within-study variance (level 1).<sup>21</sup> The indices  $i$  and  $j$  specify the source of variation of a variable. For instance, the notation  $t_{ij}$  implies that the value of  $t$  is dependent on the study  $j$ , but also on the individual,  $i$ . The specification of the model corresponds to a so-called mixed effects model, including a random effect (the intercept) and fixed effects. It is also in line with a random-effects panel model.

Table 4.4 lists the variables that are included in  $Z$  and  $X$ , respectively. The table also reports the overall, and the within and between standard deviation. Note that all variables, except *no. of countries*, are so-called indicator variables, with two possible values, 0 or 1. We include two pure level-2 variables called *working paper* and *journal*. These two variables are mutually exclusive, implying that they add up to 1, and hence only one of them can be added to avoid perfect multicollinearity. The variable *journal* tests whether marginal effects of financial liberalisation differ for studies presented in journals relative to studies presented in *working papers*.

There are two different types of measures for financial liberalisation, namely *de facto* and *de jure*.<sup>22</sup> As indicated in the table, these dummy variables also add up to 1. *De jure* combines equity, multidimensional, *KAOPEN* and bank liberalisation measures. We decided not to include each of these four measures separately since not all studies include sufficient observations for all of them (see Table 4.3).

The next set of moderator variables pertains to data characteristics. In order to investigate time-period effects, we employ dummy variables that refer to different decades or time periods: *before 1970*, *1970s*, *1980s*, *1990s*, *2000s*. For instance, the dummy variable *1970s*

<sup>20</sup> Raudenbush and Bryk (2002) propose to implement meta-analysis in terms of a two-level model.

<sup>21</sup> Model (1) is the simplest version of a hierarchical linear or multi-level model. A more general model would also allow for random slopes.

<sup>22</sup> According to Kose et al. (2010) the distinction between *de jure* and *de facto* measures of financial liberalisation is important for understanding the different findings provided by the empirical literature, which is why we explicitly investigate whether using different types of measurement explains the heterogeneity of findings about the relationship between financial liberalisation and economic growth.

is assigned the value 1 if the data in a study cover the 1970s. We do not examine the periods before 1960 and the 1960s separately due to the limited number of observations.<sup>23</sup>

In order to gauge the effects of different country types we distinguish between developing and developed countries (*dc*, *oecd*). In addition, if a study combines both groups, we indicate this by means of the dummy variable *mixed*. The distinction between developing and developed countries is crucial since, from a theoretical perspective, the outcomes of financial liberalisation in the two groups of countries can be very distinct. On the one hand, neoclassical theory postulates that the liberalisation of financial markets causes a flow of resources from capital-rich developed countries, where the return to capital is low, to capital-poor developing countries with a high return to capital (i.e. Summers 2000). On the other hand, critical voices question the positive impact of financial liberalisation in developing countries by alluding to the fact that these countries become more vulnerable to financial crises (Stiglitz 2000).

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<sup>23</sup> It is possible to combine these four categories because all of them rely on qualitative information rather than financial stocks or flows.

**Table 4.4:** Explanatory variables

Variable	Description		Mean	SD <sup>a</sup>
<b>Variables that relate to differences in publication</b>				
<i>working Paper</i>	Dummy variable equal to 1 if the study is a working paper and was not published, 0 otherwise.	} $\Sigma = 1$	0.42	0.49
				0.50
<i>journal</i>	Dummy variable equal to 1 if the study was published in a journal, 0 otherwise.		0.58	0.00
				0.49
				0.50
				0.00
<b>Variables that relate to the measurement of financial liberalisation</b>				
<i>de jure</i>	Dummy variable equal to 1 if de jure measures of financial liberalisation are used, 0 otherwise	} $\Sigma = 1$	0.60	0.49
				0.46
<i>de facto</i>	Dummy variable equal to 1 if de facto measures of financial liberalisation are used, 0 otherwise		0.40	0.23
				0.49
				0.46
				0.23
<b>Variables that relate to dataset characteristics</b>				
<i>oecd</i>	Dummy variable equal to 1 if the analysed countries are all member of the OECD, 0 otherwise.	} $\Sigma = 1$	0.12	0.32
				0.30
				0.18
<i>dc</i>	Dummy variable equal to 1 if the analysed countries are all developing countries, 0 otherwise.		0.18	0.39
				0.41
				0.22
<i>mixed</i>	Dummy variable equal to 1 if the analysed countries are mixed between developing and OECD, 0 otherwise		0.70	0.46
				0.45
				0.24
<i>no. of countries</i>	The number of countries in the study		54.99	34.31
				31.72
				20.15
<i>before 1970</i>	Dummy variable equal to 1 if the data cover the time period before 1970s, 0 otherwise	} $\Sigma = 1$	0.21	0.54
				0.55
<i>1970s</i>	Dummy variable equal to 1 if the data cover the 1970s, 0 otherwise		0.63	0.21
				0.48
				0.46



Variable	Description		Mean	SD <sup>a</sup>
				0.17
<i>1980s</i>	Dummy variable equal to 1 if the data cover the 1980s, 0 otherwise		0.93	0.25 0.24 0.10
<i>1990s</i>	Dummy variable equal to 1 if the data cover the 1990s, 0 otherwise		0.92	0.27 0.25 0.15
<i>2000s</i>	Dummy variable equal to 1 if the data cover the 2000s, 0 otherwise		0.39	0.49 0.48 0.12
<i>primary data</i>	Dummy variable equal to 1 if authors use their own data, 0 otherwise		0.41	0.49 0.45 0.25
<i>panel</i>	Dummy variable equal to 1 if the study uses panel data, 0 otherwise.		0.72	0.45 0.43 0.17

***Variables that relate to the estimation procedure***

<i>endogeneity</i>	Dummy variable equal to 1 if the study controls for endogeneity (i.e. IV or GMM), 0 otherwise		0.50	0.50 0.41 0.36
<i>fixed effect</i>	Dummy variable equal to 1 if fixed effects are included, 0 otherwise.		0.43	0.50 0.43 0.26

***Variables that relate to the economic conditions and indirect effects of flib***

<i>trade</i>	Dummy variable equal to 1 if a trade variable is included, 0 otherwise		0.39	0.49 0.46 0.27
<i>inflation</i>	Dummy variable equal to 1 if the inflation rate is included, 0 otherwise		0.30	0.46 0.45 0.20
<i>government</i>	Dummy variable equal to 1 if a measure of the size of the government is included, 0 otherwise		0.34	0.48 0.47 0.15

Variable	Description		Mean	SD <sup>a</sup>
<i>financial depth</i>	Dummy variable equal to 1 if a variable capturing the depth of the financial system is included, 0 otherwise		0.33	0.47 0.45 0.22
<i>investment</i>	Dummy variable equal to 1 if investment is included, 0 otherwise		0.56	0.50 0.49 0.16
<i>financial crisis</i>	Dummy variable equal to 1 if a financial/banking-crisis dummy is used, 0 otherwise		0.13	0.34 0.35 0.13
<i>institutions</i>	Dummy variable equal to 1 if a measure of institutions (i.e. property rights, law and order) is included, 0 otherwise		0.26	0.44 0.44 0.20
<i>human capital</i>	Dummy variable equal to 1 if a measure of human capital is included, 0 otherwise		0.73	0.44 0.47 0.14
<i>social indicators</i>	Dummy variable equal to 1 if life expectancy and/or population growth are included, 0 otherwise		0.46	0.50 0.49 0.10

Notes: <sup>a</sup>The numbers refer to the overall, between and within standard deviation (SD) respectively.

DC = developing country; OECD = Organisation for Economic Co-operation and Development; IV = instrumental variables; GMM = generalised method of moments.

In addition, we explore whether financial liberalisation effects vary because of differences in the numbers of countries (*no. of countries*) included, and whether or not the original study uses panel data (*panel*).

Next, we examine the role of different estimation procedures. Therefore, we include the dummy variable *endogeneity* which becomes 1 if a study treats the endogeneity problem inherent in liberalisation growth regressions by means of either an instrumental variable or a method of moments approach.<sup>24</sup> Moreover, we add a binary dummy variable equalling one if the original study controls for fixed effects (*fixed effect*).

For the set of relevant conditioning variables, our decision process was driven by the studies in our sample on the one hand, and by the related growth literature on the other hand. The literature offers a large spectrum of moderator variables that may at least potentially play a role in explaining growth differences. We include nine variables that capture specification differences across studies. This number is in line with other meta-studies dealing with economic growth. For instance, Doucouliagos and Ulubaşğoglu (2008) include 12 variables to account for different specifications and Abreu et al. (2005) have 12 categories of conditioning variables. The vector of conditioning variables in our meta-

<sup>24</sup> For a discussion of endogeneity in financial liberalisation--growth regressions see Bekaert et al. (2005).

analysis contains indicator variables referring to the development of the financial sector (*depth*), the openness of the real economy (*trade*), the size of the government (*government*) and the social conditions (*social indicators*) such as life expectancy or population growth. Furthermore, we use dummy variables for *investment*, *inflation*, a measure of *institutions* such as property rights or law and order and a measure of *human capital*. Finally, we add an indicator for *financial crisis*. In the growth literature, *institutions*, *human capital* and *investment* are generally found to be robustly related to economic growth (Sala-i-Martin 1997, Sala-i-Martin et al. 2004).

#### 4.4.1.1 Results

Table 4.5 reports the results of the meta-regression analysis based on 441 t-statistics we collected from the 60 studies in our sample. Each column shows a different specification of model 1. The results are based on random-effects estimation.<sup>25</sup> The dependent variable is always the t-statistic. Column (1) indicates that the unconditional mean is highly significant with a value of 1.42. It may be helpful to explain our result in more detail. As the constant reflects the average t-statistic of the financial liberalisation proxy, our results imply that we can reject the null hypothesis that the average t-statistic equals 0. Using a chi-squared test we also have to reject the null hypothesis that the average t-statistic equals 1.96 (the standard value for judging whether financial liberalisation has a significant impact on economic growth, or not). However, we cannot reject the null hypothesis that the average t-statistic equals 1.66. Hence, we conclude that although our results indicate that, on average, there is a positive effect of financial liberalisation on growth, the significance of this effect is only weak.<sup>26</sup>

Next, we focus on the role of using different types of measures for financial liberalisation. Column (2) in Table 4.5 shows that the results for studies using *de facto* measures are not statistically different from those that use *de jure* measures. A similar outcome is found when different groups of countries are considered. The results presented in column (3) suggest that the relationship between financial liberalisation and growth does not differ across types of countries. We also examine whether combinations of measures of financial liberalisation and types of countries lead to differences in outcomes. Again, we do not find significant results (see column (4)).

We proceed by investigating whether the relationship between financial liberalisation and growth may be dependent on the time span covered in the studies. Column (5) suggests that such time-period effects may indeed exist. In particular, the dummy variables for the period before the 1970s and for the 1990s are positive and significant, whereas for the 1970s and 2000s the dummy variables are negative and significant in case of the dummy variable for the 2000s<sup>27</sup>. Given that the omitted dummy variable represents data for the 1980s and that the constant (representing the effect of this dummy variable) is significant, these results suggest that the association between liberalisation and growth is stronger when a sample includes data from before 1970 and the 1990s. The results also imply that for data from the 1970s and 2000s the association is less strong compared to the 1980s.

If we do accept the above interpretation, our findings indicate that financial liberalisation measures may have been more effective before the 1970s and during the 1990s than at other times. Intuitively, this seems to make sense. First of all, before the 1970s most

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<sup>25</sup> The Hausman test showed that both the fixed- and the random-effects model are consistent. Since the random-effects model is more efficient, we use the random-effects specification.

<sup>26</sup> We acknowledge that the goodness of fit of the model is rather low. The R-squared runs from 0.00 for the specification in column (1) to 0.17 in the full specification presented in column (8). Therefore, we suggest the results of the different specifications presented in Table 4.5 should be interpreted with caution.

<sup>27</sup> The dummy variable for the 1970s is close to being significant at the 10 percent level.

governments were still pursuing strong financial repression policies (McKinnon 1973, Shaw 1973). Under these circumstances, financial liberalisation policies appear to be conducive to higher allocative efficiency of financial resources, thereby contributing to economic growth. Moreover, financial liberalisation policies were carried out most eagerly from the late 1980s through the 1990s. In developing economies several governments undertook these policies, in combination with other liberalisation measures, as part of IMF and World Bank financed structural adjustment programmes. In developed countries during the 1990s financial liberalisation was also part of a wave of economic reform based on a more liberalist view of the role of markets versus governments. The findings for the 1970s support the view that in both these decades financial liberalisation may have gone too far, leading to crisis, or at least a slowdown of economic growth. In the 1970s, several countries carried out sweeping liberalisation programmes that led to economic crisis; examples of this are Chile, Argentina and Uruguay (Diaz-Alejandro 1985). The results for the 2000s may indicate that by this time most countries had already experienced financial liberalisation in most areas, so that the marginal effect of further liberalisation was only modest.

Column (6) shows the results when we include variables relating to various other dataset characteristics (i.e. *no. of countries*, *working paper*, *primary data* and *panel*) and variables relating to the estimation procedure (i.e. *endogeneity* and *fixed effects*). None of these variables appear to be statistically significant, indicating that these study characteristics cannot explain differences between studies regarding the reported relationship between financial liberalisation and economic growth.

Finally, we explore whether financial liberalisation effects vary with the set of relevant conditioning variables. Column (7) shows that most conditioning variables do not turn out to be statistically significant, i.e. results for the relationship between financial liberalisation and growth reported in different studies do not seem to be conditional on the macroeconomic and socio-economic variables we take into account in the analysis. The only exception is the variable *financial depth* (a measure of the level of financial system development), which turns out to be negative and statistically significant. This suggests that studies taking into account this variable in their analysis report lower t-statistics for the relationship between liberalisation and growth. Given the above interpretation of the results, this would support the idea that for countries with less developed financial systems, financial liberalisation may have more value in terms of stimulating economic growth as compared to countries with more developed financial systems. An alternative interpretation of the results may be that if financial liberalisation improves financial depth, the lower t-statistic with respect to the relationship between financial liberalisation and growth (i.e. the direct effect), may be compensated by an increase in the indirect effect of financial liberalisation on growth via an increase in financial depth (Doucouliagos and Ulubaşoğlu 2008).

#### 4.4.1.2 Robustness checks

We perform a number of robustness checks. First of all, in column (8) of Table 4.5 we simultaneously include variables referring to different time periods, data characteristics, estimation procedures and conditioning variables, as an elaboration of the findings reported in the columns (5) to (7). The results in column (8) are similar to those reported in columns (5) to (7) although the time-period dummy for the period for the 1990s is no longer statistically significant.

Second, column (9) of the table shows the results when we drop all variables with a t-value below or equal to 1 from the specification presented in column (8). With respect to the time-period dummies, the results are very comparable to those presented in column (5), i.e. the dummy variables for the period before the 1970s and for the 1990s are positive and significant, whereas for the 1970s and 2000s the dummy variables are negative and

significant in case of the dummy variable for the 1970s<sup>28</sup>, providing further ground for the hypothesis that the relationship between financial liberalisation and growth may be time dependent.

Third, we redo the analysis presented in Table 4.5, but remove the top and bottom 5 percent of the observations from our dataset to check for the impact of outliers. The number of observations drops from 441 to 399. The results are reported in Appendix 4.2 Table A4.2. As the table shows the results are similar to those reported in Table 4.5. Column (1) indicates that the unconditional mean is again highly significant and does not change much as compared to the value presented in Table 4.5 (1.42 versus 1.40). As was mentioned above, since the constant reflects the average t-statistic of the financial liberalisation proxy, our results imply that we can reject the null hypothesis that the average t-statistic equals 0. However, we cannot reject the null hypothesis that the average t-statistic equals 1.66. Hence, these results again indicate that, on average, there is a positive effect of financial liberalisation on growth, although the significance of this effect appears to be weak.

The results presented in the remaining columns of table A4.2 are comparable to those presented in columns (2) to (9) in Table 4.5. Thus, different types of countries, various dataset characteristics (such as the *number of countries*, *primary data*, and *panel data*) and variables relating to the estimation procedure (i.e. *endogeneity* and *fixed effects*) do not appear to be statistically significant, indicating that these study characteristics cannot explain differences across studies regarding the reported relationship between financial liberalisation and economic growth in a sample of studies that excludes outliers. With respect to time-period effects, Table A4.2 shows that the dummy variable for the 1970s is negative and significant. This is in line with findings reported in Table 4.5, suggesting that the positive association between financial liberalisation and economic growth is weakest in the 1970s. Regarding the question of whether financial liberalisation effects vary with conditioning variables, the results in Table A4.2 confirm our finding on the importance of the level of development of the financial system, as the variable *financial depth* is again negative and significant. In contrast to the results in Table 4.5, Table A4.2 shows that the variable *working paper* is also significant and has a negative sign, indicating that in our sample of studies working papers report lower t-statistics than journal papers do for the relationship between financial liberalisation and economic growth.

As a fourth robustness check, we rerun the analysis of Table 4.5, but this time we focus on observations that are based on *de jure* measures. The results are reported in Appendix 4.2, Table A4.3. The analysis is based on a sample of 264 t-statistics collected from 41 different studies. Column (1) indicates that the unconditional mean equals 1.55, which is higher than for the full sample of t-statistics (i.e. including those referring to studies using *de facto* measures of financial liberalisation). This result again implies that we can reject the null hypothesis that the average t-statistic equals 0 and that we cannot reject the null hypothesis that the average t-statistic equals 1.66. Hence, on average, there is a positive effect of financial liberalisation on growth.

Most of the results in Table A4.3 are comparable to those presented in Table 4.5, i.e. different types of countries, dataset characteristics and variables relating to the estimation procedure are not statistically significant, indicating that for the subsample of studies using *de jure* measures of financial liberalisation most study characteristics also cannot explain differences between studies about the reported relationship between financial liberalisation and economic growth. With respect to time-period effects, Table A4.3 shows that the dummy variable for the 1990s is positive and significant. This is in line with findings reported in Table 4.5. Moreover, the dummy for the 1970s period is negative and significant, which also is in line with findings reported in Table 4.5. Taken together, the findings for the time-period dummy variables in Tables 4.5 and A4.3 allow us to

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<sup>28</sup> The dummy variable for the 1990s is close to being significant at the 10 percent level.

conclude that the positive association between financial liberalisation and economic growth is strongest for the 1990s and weakest in the 1970s. The results in Table A4.3 also confirm our previous finding about the importance of the level of development of the financial system, as the variable *financial depth* is again negative and significant. In contrast to the results in Table 4.5, Table A4.3 shows that the variable *working paper* is also significant and has a negative sign, indicating that in a sample of studies using *de jure* measures of financial liberalisation, working papers report lower t-statistics than journal papers do for the relationship between financial liberalisation and economic growth.

The fifth robustness check that we perform relates to the working papers included in the dataset. One may argue that, at least potentially, working papers included in our dataset that have been published during the last few years may become journal articles in the future. This would mean that these papers are counted as working papers in our analysis, whereas in fact they should have been counted as published papers. To control for this potential bias we delete all working papers that have been published during the period 2008-11 from our dataset. This reduces the sample to 405 t-statistics collected from 54 different studies. The results are reported in Appendix 4.2, Table A4.4. As the table shows, the results are qualitatively similar to those discussed above. We note that in this robustness check the variable *working paper* is not significant, which contrasts with the results reported for the robustness checks presented in Tables A4.2 and A4.3, but corroborates the base results presented in Table 4.5.

Finally, we take out the study by Tornell et al. (2004). Table 4.2 and the box plot in Figure 4.3 show that this study appears to be an outlier: the highest mean of the t-statistics reported in other studies is 5.7 (i.e. Bekaert et al. 2003), whereas the mean t-statistic reported in the Tornell et al. (2004) study is 10.8. To control for the fact that this study may be considered an outlier, we remove it from our dataset and rerun the analysis presented in Table 4.5 as well as all the robustness checks discussed above. The results are qualitatively similar to those discussed above.<sup>29</sup>

Summarising the results presented in Table 4.5 and outcomes of the various robustness checks, the following two main findings stand out. First, there is a positive, albeit weakly significant, effect of financial liberalisation on economic growth. Second, with respect to the variables that are supposed to explain the heterogeneity of financial liberalisation coefficients, we find negative and robust results for the time-period variable capturing financial liberalisation policies carried out during the 1970s and the variable indicating whether or not studies takes into account a measure of the level of development of the financial system.

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<sup>29</sup> The results are not reported, but are available upon request.

**Table 4.5:** Meta-regression analysis

Variable	(1)	(2) <sup>a</sup>	(3) <sup>b</sup>	(4) <sup>c</sup>	(5) <sup>d</sup>	(6)	(7)	(8) <sup>d</sup>	(9) <sup>d</sup>
<i>constant</i>	1.42*** (0.30)	1.57*** (0.55)	1.43*** (0.47)	1.81*** (0.55)	1.15** (0.57)	1.35* (0.76)	2.18*** (0.58)	1.78 (1.12)	1.55** (0.62)
<i>de jure</i>		-0.24 (0.67)							
<i>mixed</i>			-0.13 (0.65)						
<i>dc</i>			0.30 (0.38)						
<i>dejure × oecd</i>				-0.93 (1.17)					
<i>de jure × dc</i>				-0.89 (0.83)					
<i>de jure × mixed</i>				-0.43 (0.64)					
<i>de facto × dc</i>				0.40 (0.33)					
<i>de facto × mixed</i>				-0.51 (0.73)					
<i>before 1970</i>					0.83* (0.43)			0.66* (0.40)	0.75* (0.42)
<i>1970s</i>					-0.64			-0.76* (0.40)	-0.77* (0.42)

		(0.40)	(0.44)	(0.44)
1990s	0.92**		0.86	1.00**
	(0.46)		(0.60)	(0.51)
2000s	-0.93*		-0.96*	-0.82
	(0.52)		(0.57)	(0.53)
working paper		-0.66	-0.62	
		(0.75)	(0.70)	
no. of countries		0.00	0.00	
		(0.00)	(0.00)	
panel data		1.02	1.18	
		(1.28)	(1.36)	
endogeneity		-0.03	-0.13	
		(0.30)	(0.32)	
fixed effect		-0.64	-0.48	
		(0.71)	(0.68)	
primary data		-0.02	-0.09	
		(0.30)	(0.30)	
financial crisis		-0.19	-0.39	
		(0.86)	(0.74)	
inflation		-0.43	-0.57	-0.52
		(0.41)	(0.36)	(0.41)
depth		-0.85***	-0.86***	-0.78***
		(0.25)	(0.24)	(0.25)
government		-0.58	-0.48	-0.39



							(0.43)	(0.44)	(0.41)	
	<i>trade</i>						0.66	0.65	0.63	
							(0.45)	(0.42)	(0.41)	
	<i>investment</i>						-0.38	-0.32		
							(0.47)	(0.39)		
	<i>institutions</i>						-0.49	-0.40	-0.50	
							(0.37)	(0.36)	(0.34)	
	<i>human capital</i>						0.04	0.07		
							(0.42)	(0.44)		
	<i>social indicators</i>						-0.22	-0.17		
							(0.58)	(0.55)		
	$\sigma_u$	1.97	1.97	2.01	2.02	1.87	1.95	1.99	1.84	1.81
	$\sigma_e$	1.95	1.94	1.94	1.92	1.95	1.95	1.95	1.95	1.95
	$R^2$	0.00	0.03	0.01	0.01	0.07	0.05	0.07	0.19	0.12
	<b>M</b>	441	441	441	441	441	441	441	441	441
	<b>N</b>	60	60	60	60	60	60	60	60	60

Notes: Standard error given in parentheses. \*\*\*, \*\*, \* denotes significance at the 1%, 5% and 10% level, respectively. There are no observations in the case of *oecd* x equity (where equity refers to studies using one of the measures of equity market liberalisation) and well as bank x mixed (where bank refers to studies using one of the measures of bank sector liberalisation). M refers to the total number of observations and N represents the total number of studies.  $\sigma_e$  and  $\sigma_u$  stand for the within-study and between-study standard deviations, respectively. We report these standard deviations in the table, because, by comparing the between- and within-study variances, we can gauge the proportion of the total variance of the residuals that is explained by studies. To be more precise, the larger the between-study variance relative to the within-study variance, the stronger the influence of effects shared by studies (such as author, time period, etc.). In our case, the two variance components have similar magnitudes implying that effects shared by studies account for approximately half of the total variance. In the estimations, we account for clustering of the standard errors.

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<sup>a</sup>The *de facto* measure has been omitted. The constant represents the effect of the omitted variable.

<sup>b</sup>The *oecd variable* has been omitted. The constant represents the effect of the omitted variable.

<sup>c</sup>The interaction *de facto* × *oecd* has been omitted. The constant represents the effect of the omitted variable.

<sup>d</sup>The *1980s* indicator has been omitted.

#### 4.4.2 Publication selection bias

In this section, we want to look at our dataset from a different angle. Therefore, we assume that our data potentially suffer from publication selection bias. Moreover, we assume that such a bias is captured by a systematic relationship between the effect size and the standard error. According to Florax (2001) ‘[p]ublication bias occurs when only studies reporting statistically significant results or with a “reasonable” magnitude of the effect size are being published, and others are not.’ Publication bias is a crucial issue because it implies that the studies included in a meta-analysis might be a biased sample of the overall population of studies leading to biased conclusions about the relationship between financial liberalisation and economic growth. Only if it was possible to identify enough studies that have not gone through an official revision process by some university, institution, journal or the like, could the problem of publication bias be disregarded, because in this situation we could directly compare the studies of published and unpublished outcomes (Borenstein et al. 2009).

It is controversial whether publication status is an adequate decision criterion for the inclusion of a study in a meta-analysis. On the one hand, peer review ensures that a study adheres to certain quality standards. On the other hand, the distinction between journal articles, working papers and unpublished papers is to some extent arbitrary, since the contribution of an unpublished paper from a top-ranked university in terms of methodological rigour as well as value-addition might be higher than that of an article in a low-ranked journal (Borenstein et al. 2009, Florax 2001). In the end, the whole issue of publication bias boils down to the problem that a meta-analysis tends to under- or over-estimate the true relationship between two variables if the included studies are a biased sample. Therefore, we want to scrutinise our meta-sample for the presence of publication selection bias.

Before we continue explaining our statistical approach, we would like to emphasise that there is considerable discussion in the literature about the proper measurement of publication selection bias, especially with respect to the implementation of the concept in statistical tests. Such tests implicitly assume that selection is driven by statistical significance, but this does not need to be the case, as there may be other sources of selection bias. Moreover, instead of publication selection bias, a meta-sample may be characterised by true heterogeneity, such as heterogeneity between small and large studies (i.e. smaller studies might have been conducted for particular reasons). We are therefore somewhat sceptical regarding the value of testing for publication selection bias. Nonetheless, for the sake of completeness of our analysis, we perform a statistical test of publication selection bias, using a methodology that has been widely used in the literature. In an early contribution, Egger et al. (1997) established the following regression model in order to detect publication selection bias:

$$\text{coefficient}_i = \beta_0 + \beta_1 se_i + u_i, \quad (2)$$

where  $\text{coefficient}_i$  denotes the regression coefficient of the original study and  $se_i$  is the corresponding sample standard error. Without publication selection bias,  $\beta_1$  will be 0. This implies that a systematic relationship between  $\text{coefficient}$  and  $se$  does not exist. In other words, a *non-zero*  $\beta_1$  indicates to what extent studies based on smaller samples tend to search for larger coefficients in order to make up for larger standard errors (Doucouliagos and Stanley 2009).

We would like to state that the measurement of publication selection bias using the above methodology may be potentially problematic in the context of our meta-

sample, since different studies have used variables of financial liberalisation that may (widely) diverge in terms of their dimensions (i.e. ratios versus absolute values). This implies that standard errors will also differ depending on the underlying type of variable used. These differences will, however, be unrelated to potential publication selection bias. Thus, it might be difficult to distinguish dimensional effects from publication selection bias.

Doucouliagos and Stanley (2009) suggest dividing equation (2) by the standard error ( $se_i$ ) to remedy the problem of heteroscedastic error terms ( $e_i$ ). Heteroscedasticity is caused by research studies using different estimation methods, model specifications and sample sizes to explain the same relationship. Hence we rewrite equation (2) in the following way:

$$t_i = \beta_1 + \beta_0 1/se_i + e_i. \quad (3)$$

Next, if we take into account the two-level structure of our data, it is possible to represent model (3) as:

$$\text{level 1: } t_{ij} = \beta_{1j} + \beta_{00} 1/se_{ij} + \sum_l \beta_l \frac{X_{l,ij}}{se_{ij}} + \sum_p \beta_p \frac{Z_{p,j}}{se_{ij}} + e_{ij}, \quad (4)$$

$$\text{level 2: with } \beta_{1j} = \pi_{00} + u_{0j},$$

with  $t_{ij}$  denoting the  $i^{\text{th}}$  t-statistic of study  $j$ . Note that the structure of model (4) is similar to that of model (1). Again,  $Z$  and  $X$  are vectors of conditioning variables explaining differences in the financial-liberalisation effect within and between studies. First, we will estimate the unconditional model. Second, we will estimate the conditional model including the variables from model (8) in section 4.4.

In order to detect publication selection bias, we run a conventional t-test on  $\pi_{00}$ .<sup>30</sup> The underlying idea is that without publication selection bias, the t-statistic and the standard error ( $se_{ij}$ ) should be inversely related through  $\beta_{00}$  (in the unconditional model) which can be considered as the genuine effect of financial liberalisation. (Egger et al. 1997, Klomp and de Haan 2010).<sup>31,32</sup>

#### 4.4.2.1. Results

Table 4.4 presents the results on the basis of equation (4). We report results of random-effects estimation. In the case of the unconditional model (column 1), the coefficient of the inverse standard error is insignificant. To put it differently, we

<sup>30</sup> In the terminology of Egger et al. (1997) or Doucouliagos and Stanley (2009), this test is also called funnel graph asymmetry test (FAT).

<sup>31</sup> Doucouliagos and Stanley (2009) refer to the t-test on  $\beta_{00}$  as the precision effect test (PET).

<sup>32</sup> Note that Doucouliagos (2005) remains critical about the interpretation of  $\beta_{00}$  as the genuine effect.

find no evidence of a genuine association between financial liberalisation and economic growth. Apparently, the estimation outcome is dominated by the constant which suggests that there is a systematic association between the coefficient and the standard error.

It is of interest whether these findings persist if we include further conditioning variables (column 2). Concerning the interpretation of the results, the reader should recall that we interpreted the coefficients on the  $Z$  and  $X$  variables in Table 4.4 in terms of  $t$ -statistics. Here, instead, these coefficients give us an indication of the corrected effect of financial liberalisation on economic growth. Hence, the overall effect of financial liberalisation is obtained by combining several factors (i.e. those that turn out to be significant).

A first important result is that publication selection bias again is at work. Apart from that, the coefficient on the inverse standard error now appears to be significant. Thus, supposing that the variables in  $X$  and  $Z$  were 0 (which means that, inter alia, data from the 1980s were used) financial liberalisation seems to have a positive, but small, effect on economic growth. In addition, we find significant coefficients on some additional variables. Controlling for financial development, investment and institutions reduces the significance of financial liberalisation coefficient, whereas trade increases it. These findings support the view that financial development, institutions and investment are important channels through which financial liberalisation stimulates economic growth. Studies that address the endogeneity problem inherent in growth regressions report slightly larger  $t$ -statistics. The financial liberalisation effect appears to less significant in the case of working papers. Concerning the time periods, the significant coefficients flip sign vis-à-vis the results in Table 4.5 such that it becomes difficult to interpret them.

**Table 4.6:** Publication selection bias

	1	2 <sup>a</sup>
	RE	RE
constant	1.21*** (0.32)	1.076*** (0.347)
1 (se)	0.001 (0.001)	0.007* (0.004)
<i>working paper</i> (se)		-0.006** (0.003)
<i>financial crisis</i> (se)		0.005 (0.005)
<i>inflation</i> (se)		-0.001 (0.002)
<i>depth</i> (se)		-0.002* (0.001)
<i>government</i> (se)		-0.002 (0.002)

	1	2 <sup>a</sup>
	RE	RE
<i>trade</i> (se)		0.0031* (0.002)
<i>investment</i> (se)		-0.004** (0.002)
<i>institutions</i> (se)		-0.002* (0.001)
<i>human capital</i> (se)		0.003 (0.003)
<i>social indicators</i> (se)		-0.001 (0.002)
<i>no. of countries</i> (se)		0.000 (0.000)
<i>panel data</i> (se)		0.000
<i>endogeneity</i> (se)		0.002* (0.001)
<i>fixed effect</i> (se)		0.002 (0.003)
<i>primary data</i> (se)		-0.001 (0.002)
<i>before 1970</i> (se)		0.002 (0.004)
<i>1970s</i> (se)		0.005* (0.002)
<i>1990s</i> (se)		-0.005* (0.003)
<i>2000s</i> (se)		-0.003 (0.003)
<b>M</b>	441	435
<b>N</b>	60	58
$\sigma_u$	1.95	2.07
$\sigma_e$	1.94	1.93
<b>R<sup>2</sup></b>	0.02	0.11

Notes: standard error given in parentheses. \*\*\*, \*\*, \* denotes significance at the 1%, 5% and 10% level, respectively. M refers to the total number of observations and N represents the total number of studies.  $\sigma_e$  and  $\sigma_u$  stand for the within-

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study and between-study standard deviations, respectively. In the estimation, we account for clustering of the standard errors.

<sup>a</sup>The 1980s indicator has been omitted.

Based on our findings, and accepting that the methodology used correctly addresses publication selection bias, we conclude that publication bias might play a role in the financial liberalisation literature. Apart from that, we find evidence of a slightly positive, genuine relationship between financial liberalisation and economic growth. Moreover, various factors impact the significance of the liberalisation-growth nexus. However, relative to the results presented in Table 4.5, *financial development* is the only variable that is found to robustly lower the liberalisation-growth nexus. But, as discussed above, we remain sceptical of the validity of for publication selection bias using methodologies presented in the existing literature.

## 5. Conclusions and final remarks

Since the early 1970s, the relationship between financial liberalisation and economic growth has been hotly debated, in both in policy and academic circles. On the one hand, this is due to the fact that during the past two decades many countries have liberalised their domestic financial markets. On the other hand, views with respect to the impact of these liberalisation policies differ. Whereas some have claimed that liberalisation of financial markets contributes to the efficiency with which these markets can transform saving into investment, which ultimately fosters economic growth, others have pointed out that these liberalisations have contributed to various financial and economic crises in the past. Several papers have investigated the nature of the relationship between financial liberalisation and economic growth. The evidence that emerges from these studies remains inconclusive.

In this study we aimed at providing a systematic analysis of the empirical literature by conducting a meta-analysis of the relationship between financial liberalisation and economic growth based on 60 empirical studies and 441 t-statistics. As far as we know, this is the first study using meta-analysis as a tool to investigate the financial liberalisation-growth nexus.

In the meta-analytical framework we have used, we focus on explaining the heterogeneity of results regarding the relationship between financial liberalisation and economic growth reported in the studies in our sample. In particular, we focus on a number of study-, data- and method-specific characteristics, such as the way financial liberalisation has been measured (*de jure* versus *de facto* measures), whether the study has been published as a working paper or as a peer-reviewed academic journal article, the time periods covered by the original studies (i.e. before the 1970s, and in the 1980s, 1990s and 2000s), the type of countries included in the analysis (developed countries, developing countries and a mixed set of developed and developing countries), the number of countries taken into account in the analysis, whether or not panel data are used, whether potential endogeneity problems have been treated, whether or not fixed effects are used, and whether or not a set of relevant conditioning variables has been included (i.e. measures of the development of the financial sector, the openness of the real economy, the size of the government, life expectancy, population growth, investment, inflation, property rights, law and order, human capital and financial crises).

The meta-regression analysis provided the following main results. First, the unconditional mean of the t-statistic of the financial liberalisation variable equals 1.42, which is highly significant. Using a chi-squared test we also have to reject the null hypothesis that the average t-statistic equals 1.96. However, we cannot reject the null hypothesis that the average t-statistic equals 1.66. Hence, we conclude that although our results indicate that, on average, there is a positive effect of financial liberalisation on growth, the significance of this effect is only weak.

Second, for most of the variables that may help explaining the heterogeneity of results about the relationship between financial liberalisation and economic growth we do not find any significant results. There are two exceptions. Our analysis suggests that data from the 1970s generate more negative financial liberalisation coefficients which suggests that financial liberalisation policies carried out during the 1970s seem to have a stronger negative relationship with growth. Moreover, our results show that studies that take into account a measure of the level of



development of the financial system report lower t-statistics for the relationship between liberalisation and growth. When we take publication selection bias into account, financial development still seems to lower the significance of the financial liberalisation coefficient, whereas the coefficient capturing data from the 1970s flips sign. Another outcome of this last exercise is that we find several additional factors to impact on the liberalisation-growth nexus. Apart from these results we find suggestive evidence that publication bias matters in the liberalisation-growth literature.

We have two reasons for being sceptical about the validity of testing for publication selection bias, at least in our sample of studies. First, the measurement and the operationalisation of the concept in statistical tests have been debated recently. Existing tests implicitly assume that selection is driven by statistical significance, but this does not need to be the case, as there may be other sources of selection bias. Second, the measurement of publication selection available in the literature seems, at least potentially, problematic in the context of the studies in our sample, since different studies used variables of financial liberalisation that may (widely) diverge in terms of their dimensions (i.e. ratios versus absolute values). This boils down to observing differences in standard errors, depending on the underlying type of variable used, which may be unrelated to potential publication selection bias.

We would like to make some final qualifying remarks regarding the use of meta-analytical methods to investigate studies on the relationship between financial liberalisation and economic growth. First of all, we point out that the quality of the meta-analysis we carry out in this study is as good as the quality of the empirical analysis of the underlying empirical literature. The studies we use in our dataset are carried out in the country growth regression tradition. This literature has received considerable criticism recently, especially with respect to potential endogeneity problems. Solving these problems in a convincing and satisfying way has proven to be very difficult in this strand of literature. Moreover, country growth regressions are often criticised for their lack of a clear theoretical framework underlying the empirical model. In the context of the relationship between financial liberalisation and economic growth, this point has been made explicit by Henry (2007).

Second, the use of meta-regression analysis is complicated by the fact that, as has already been mentioned, different studies use different measures and dimensions of financial liberalisation. This renders a comparison of results across studies more difficult. Put another way, using meta-analysis works best if studies use the same measures and dimensions with respect to the variable(s) of interest. Another complicating factor is that the studies in our sample use data from a limited set of observations, i.e. countries in the world, and all data used come from similar sources, such as IMF and World Bank databases.

Third, a number of interesting issues discussed in the literature on the relationship between financial liberalisation and economic growth are not taken into account in this meta-analysis. The reason for this is that the low number of studies investigating these issues does not allow for a meaningful meta-regression analysis. One example is the discussion on the short- and long-term effects of financial liberalisation. A few researchers have recently argued that opposing economic forces in the short and the long run result in a non-monotonic relationship between financial liberalisation and economic growth. However, this strand of research does not produce clear results. On the one hand, there is the hypothesis of '*short-run gain, long-run pain*' caused by financial liberalisation. Bussière and Fratzscher (2008) argue that this trade-off is attributable to the features of short-term

financial flows. In the five years following financial liberalisation, countries benefit from investment booms and debt inflows, whereas in the long run these countries will typically end up in a debt trap. Furthermore, the authors point out that appropriate institutions attenuate the adverse effects of unbounded financial flows. On the other hand, some authors find evidence of a '*short-run pain and long-run gain*' of financial liberalisation.<sup>33</sup> For instance, Kaminsky and Schmukler (2008) examine interdependencies between financial liberalisation and financial cycles. They suggest that, on impact, financial liberalisation provokes financial instability and crises owing to weak institutions. Over the medium to long run, however, unrestricted capital flows stimulate institutional development such that financial markets can stabilise the economy. Further research is needed to be able to draw meaningful conclusions on the different effects of the short- and long-term run growth effects of financial liberalisation, for example by employing meta-regression analysis.

Notwithstanding these qualifying remarks, we do think that the meta-analysis we carry out in this paper is highly valuable, as it provides the most comprehensive overview of the literature on the relationship between financial liberalisation and growth available to date. Moreover, it is the first systematic analysis of this literature. The future challenge will be to improve upon the meta-analytical techniques we may use to extend the analysis of the financial liberalisation-growth nexus.

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<sup>33</sup> Campos et al. (2011) investigate the links between political instability, financial development and economic growth in the case of Argentina. They find that financial development can be detrimental to growth in the short run and growth supportive in the long run. However, the negative consequences of political instability may outweigh such positive effects. The authors do not consider financial liberalisation. Nevertheless, their findings add to the literature which attempts to gauge the growth effects of finance over different time horizons.

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## Appendices

### Appendix 1.1: Authorship of this report

The authors of this report are:

Silke Bumann, University of Groningen, the Netherlands.

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Robert Lensink, Wageningen University, the Netherlands.

### Review group

This review group is made up of researchers from the Faculty of Economics and Business, University of Groningen, the Netherlands, namely Silke Bumann, Niels Hermes and Robert Lensink. Niels Hermes is also affiliated to the Solvay Brussels School of Economics and Management, Université Libre de Bruxelles, Belgium. Robert Lensink is also affiliated to the Development Economics Group, Wageningen University, the Netherlands.

### Advisory Group

We have identified Birte Snilstveit and Henri de Groot as academic peer reviewers for their expertise in systematic reviewing to advise us on this project.

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### **Conflicts of interest**

None of the authors have any financial interests in this review topic.

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## Appendix 4.1: Studies included in the meta-sample

**Table A4.1:** Studies included in the meta-sample

#	Author(s)	Title	Published by/in
1	Achy L (2005)	<i>Financial liberalization, saving, investment and growth in MENA countries</i>	EconWPA (Finance).
2	Arteta C, Eichengreen B, Wyplosz C (2001)	<i>When does capital account liberalization help more than it hurts?</i>	NBER Working Papers (8414).
3	Bailliu JN (2000)	<i>Private capital flows, financial development, and economic growth in developing countries</i>	Bank of Canada.
4	Bekaert G, Harvey CR, Lundblad C (2001)	Emerging equity markets and economic development	<i>Journal of Development Economics</i> 66(2): 465-504.
5	Bekaert G, Harvey CR, Lundblad C (2003)	Equity market liberalization in emerging markets	<i>Journal of Financial Research</i> 2(3): 275-299.
6	Bekaert G, Harvey CR, Lundblad C (2005)	Does financial liberalization spur growth?	<i>Journal of Financial Economics</i> 77(1): 3-55.
7	Ben Gamra S (2009)	Does financial liberalization matter for emerging East Asian economies growth?	<i>International Review of Economics and Finance</i> 18(3): 392-403.
8	Ben Naceur S Ghazouani S, Omran M (2008)	Does stock market liberalization spur financial and economic development in the MENA region?	<i>Journal of Comparative Economics</i> 36(4): 673-693.
9	Bonfiglioli A, Mendicino C (2004)	<i>Financial liberalization, bank crises and growth: assessing the links</i>	Department of Economics and Business, Universitat Pompeu Fabra.

#	Author(s)	Title	Published by/in
10	Bordo MD, Meissner C M (2007)	<i>Foreign capital and economic growth in the first era of globalization</i>	NBER Working Papers (13577).
11	Bussière M, Fratzscher M (2008)	Financial openness and growth: short-run gain, long-run pain?	<i>Review of International Economics</i> 16(1): 69-95.
12	Butkiewicz J, Yanikkaya H (2008)	Capital account openness, international trade, and economic growth: a cross-country empirical investigation	<i>Emerging Markets Finance and Trade</i> 44(2): 15-38.
13	Calderon C, Loayza N, Schmitt-Hebbel K (2005)	<i>Does openness imply greater exposure?</i>	Policy Research Working Paper Series 3733, The World Bank.
14	Choong CK, Baharumsha AZ, Yusop Z, Habibullah MS (2010)	Private capital flows, stock market and economic growth in developed and developing countries: a comparative analysis	<i>Japan and the World Economy</i> 22(2): 107-117.
15	De Ávila Torrijos DR (2003)	<i>Finance and growth in the EU - new evidence from the liberalisation and harmonisation of the banking industry</i>	ECB Working Paper Series 266.
16	De Gregorio J (1998)	Financial integration, financial development and economic growth	<i>Estudios de Economía</i> 26(2 Year 19): 137-161.
17	Dreher A (2006)	Does globalization affect growth? Evidence from a new index of globalization	<i>Applied Economics</i> , 38(10): 1091-1110.
18	Durham JB (2004)	Absorptive capacity and the effects of foreign direct investment and equity foreign portfolio investment on economic growth	<i>European Economic Review</i> 48(2): 285-306.

#	Author(s)	Title	Published by/in
19	Edison HJ, Levine R, Ricci L, Slok T (2002)	International financial integration and economic growth	<i>Journal of International Money and Finance</i> 21(6): 749-776
20	Edison HJ, Klein MW, Ricci LA, Slok, T (2004)	<i>Capital account liberalization and economic performance: survey and synthesis</i>	IMF Staff Papers 51(2): 220-256.
21	Edwards S (2001)	<i>Capital mobility and economic performance: are emerging economies different?</i>	NBER Working Papers (8076) .
22	Edwards S (2004)	<i>Financial openness, sudden stops, and current-account reversals.</i>	NBER Working Papers (10277).
23	Eichengreen B. Leblang D (2003)	Capital account liberalisation and growth: was Mr. Mahathir right?	<i>International Journal of Finance and Economics</i> 8(3): 205-224.
24	Francois JF, Schuknecht L (1999)	<i>Trade in financial services: procompetitive effects and growth performance</i>	CEPR Discussion Papers No. 2144.
25	Fuchs-Schuendeln, N, Funke N (2004)	Stock market liberalisations: financial and macroeconomic implications	<i>Review of World Economics</i> 40(3): 730-761.
26	Garita G (2009)	<i>How does financial openness affect economic growth and its components?</i>	MPRA Paper (20099).
27	Haveman JD, Lei V, Netz JS (2001)	International integration and growth: A survey and empirical investigation	<i>Review of Development Economics</i> 5(2): 289-311.
28	Hermes N, Lensink R (2008)	<i>Does financial liberalisation influence saving, investment and economic growth? evidence from 25 emerging market economies, 1973-96</i>	ULB - Universite Libre de Bruxelles (2013/14403)

#	Author(s)	Title	Published by/in
29	Holland M ,Vilela Vieira F (2005)	Foreign liquidity, economic opening and growth in Latin American economies	<i>Revista Brasileira de Economia</i> 59(2): 267-289.
30	Honig A (2008)	Addressing causality in the effect of capital account liberalisation on growth	<i>Journal of Macroeconomics</i> 30(4), 1602-1616.
31	IMF (2007)	<i>Reaping the benefits of financial globalization</i>	IMF Occasional Paper 264.
32	IMF (2008)	<i>Structural reforms and economic performance in advanced and developing countries</i>	IMF Occasional Paper 268.
33	Klein W (2003)	<i>Capital account openness and the varieties of growth experience</i>	National Bureau of Economic Research (9500).
34	Klein MW (2005)	<i>Capital account liberalisation, institutional quality and economic growth: theory and evidence</i>	National Bureau of Economic Research (11112).
35	Kose MA, Prasad ES, Terrones ME (2006)	How do trade and financial integration affect the relationship between growth and volatility?	<i>Journal of International Economics</i> 69(1): 176-202.
36	Kose MA, Prasad ES, Taylor, AD (2011)	Thresholds in the process of international financial integration	<i>Journal of International Money and Finance</i> 30(1): 147-179
37	Lee I, Shin JH (2008)	Financial liberalisation, crises, and economic growth	<i>Asian Economic Papers</i> 7(1): 106-115.
38	Levine R, Zervos S (1998)	Stock markets, banks, and economic growth	<i>American Economic Review</i> 88(3): 537-558.
39	Masten AB, Coricelli F, Masten I (2008)	Non-linear growth effects of financial development: does financial integration matter?	<i>Journal of International Money and Finance</i> 27(2): 295-313.

#	Author(s)	Title	Published by/in
40	McLean B, Shrestha S (2002)	<i>International financial liberalisation and economic growth</i>	RBA Research Discussion Papers.
41	Mody A, Abiad A, Leigh D (2007)	<i>International finance and income convergence: Europe is different</i>	IMF Working Papers 07/64.
42	Mukerji P (2009)	Ready for capital account convertibility?	<i>Journal of International Money and Finance</i> 28(6): 1006-1021.
43	Neto D, Veiga FJ (2008)	<i>Financial globalization, convergence and growth</i>	NIPE Working Papers 07/2008.
44	Prasad E, Rogoff K, Wei S, Kose MA (2003)	<i>Effects of financial globalization on developing countries: some empirical evidence</i>	IMF Occasional Paper 220.
45	Prasad E, Rajan RG, Subramanian A (2007)	<i>Foreign capital and economic growth</i>	National Bureau of Economic Research (13619).
46	Quinn DP (1997)	The correlates of change in international financial regulation	<i>The American Political Science Review</i> 91(3): 531-551.
47	Quinn DP, Toyoda A (2001)	<i>How and where capital account liberalisation leads to economic growth</i>	Unpublished manuscript.
48	Quinn DP (2003)	Capital account liberalisation and financial globalization, 1890-1999: a synoptic view	<i>International Journal of Finance and Economics</i> 8(3): 189-204.
49	Quinn DP, Toyoda A (2008)	Does Capital Account Liberalisation Lead To Growth?	<i>The Review of Financial Studies</i> 21(3): 1403-1449.

#	Author(s)	Title	Published by/in
50	Ranciere R, Tornell A, Westermann F (2006)	Decomposing the effects of financial liberalisation: crises vs. growth	<i>Journal of Banking and Finance</i> 30(12): 3331-3348.
51	Razin A, Rubinstein Y (2004)	<i>Growth effects of exchange rate regimes and capital account liberalisation in the presence of crises: a nuanced view</i>	NBER Working Paper (10555).
52	Reisen H, Soto M (2001)	Which types of capital inflows foster developing-country growth?	<i>International Finance</i> 4(1): 1-14.
53	Rincon H (2007)	<i>Financial globalization, economic growth, and macroeconomic volatility</i>	Borradores de Economía No 430, Banco de la República Colombia.
54	Rodrik D, Subramanian A (2009)	Why did financial globalization disappoint?	<i>IMF Staff Papers</i> , 56(1): 112-138.
55	Romero-Avila D (2009)	Liberalisation of capital controls and interest rates restrictions in the EU-15: did it affect economic growth?	<i>Applied Financial Economics</i> 19(20): 1625-1648.
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60	World Bank (2001)	<i>Global development finance 2001: building coalitions for effective development finance</i>	The World Bank.

## Appendix 4.2: Results from additional robustness checks

Table A4.2: Omission of top and bottom 5 percent of observations

Variable	(1)	(2) <sup>a</sup>	(3) <sup>b</sup>	(4) <sup>c</sup>	(5) <sup>d</sup>	(6)	(7)	(8) <sup>d</sup>
constant	1.40*** (0.20)	1.76*** (0.33)	1.54*** (0.30)	1.75*** (0.42)	1.08** (0.50)	1.68*** (0.41)	2.07*** (0.4)	1.93** (0.88)
<i>de jure</i>		-0.59 (0.45)						
<i>mixed</i>			-0.29 (0.33)					
<i>dc</i>			0.16 (0.33)					
<i>dejure</i> × <i>oecd</i>				-0.47 (1.11)				
<i>de jure</i> × <i>dc</i>				-0.82 (0.77)				
<i>de jure</i> × <i>mixed</i>				-0.64 (0.53)				
<i>de facto</i> × <i>dc</i>				0.51* (0.28)				
<i>de facto</i> × <i>mixed</i>				-0.18 (0.38)				
<i>before 1970</i>					0.67* (0.39)			0.58 (0.39)

1970s	-0.41*		-0.50**
	(0.23)		(0.24)
1990s	0.72		0.70
	(0.51)		(0.58)
2000s	-0.63		-0.58
	(0.40)		(0.39)
<i>working paper</i>		-0.74*	-0.71*
		(0.39)	(0.38)
<i>no. of countries</i>		-0.00	0.00
		(0.00)	(0.00)
<i>panel data</i>		0.27	0.32
		(0.45)	(0.41)
<i>endogeneity</i>		-0.06	-0.14
		(0.21)	(0.22)
<i>fixed effect</i>		-0.19	-0.02
		(0.44)	(0.35)
<i>primary data</i>		0.12	0.06
		(0.28)	(0.29)
<i>financial crisis</i>		-0.38	-0.47
		(0.73)	(0.69)
<i>inflation</i>		-0.14	-0.25
		(0.34)	(0.29)
<i>depth</i>		-0.71***	-0.72***
		(0.19)	(0.21)



Appendix 4.2: Results from additional robustness checks

<i>government</i>							-0.31	-0.20
							(0.34)	(0.32)
<i>trade</i>							0.43	0.45
							(0.40)	(0.35)
<i>investment</i>							-0.08	-0.06
							(0.26)	(0.24)
<i>institutions</i>							-0.41	-0.39
							(0.35)	(0.34)
<i>human capital</i>							-0.04	-0.02
							(0.27)	(0.27)
<i>social indicators</i>							-0.50	-0.45
							(0.43)	(0.38)
$\sigma_u$	1.44	1.44	1.47	1.49	1.33	1.41	1.43	1.28
$\sigma_e$	1.34	1.31	1.33	1.30	1.34	1.35	1.33	1.34
$R^2$	0.00	0.03	0.01	0.02	0.04	0.03	0.05	0.13
<b>M</b>	399	399	399	399	399	399	399	399
<b>N</b>	60	60	60	60	60	60	60	60

Notes: Standard error given in parentheses. \*\*\*, \*\*, \* denotes significance at the 1%, 5% and 10% level, respectively. There are no observations for *oecd* × *equity* (where *equity* refers to studies using one of the measures of equity market liberalisation) as well as *bank* × *mixed* (where *bank* refers to studies using one of the measures of bank sector liberalisation). **M** refers to the total number of observations and **N** represents the total number of studies.  $\sigma_e$  and  $\sigma_u$  stand for the within-study and between-study standard deviations, respectively. In the estimations, we account for clustering of the standard errors.

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- <sup>a</sup> The *de facto* measure has been omitted. The constant represents the effect of the omitted variable.
- <sup>b</sup> The *oecd* variable has been omitted. The constant represents the effect of the omitted variable.
- <sup>c</sup> The interaction *de facto* × *oecd* has been omitted. The constant represents the effect of the omitted variable.
- <sup>d</sup> The *1980s* indicator has been omitted.

**Table A4.3:** Meta-regression analysis for the *de jure* measure

Variable	(1)	(2) <sup>a</sup>	(3) <sup>b</sup>	(4)	(5)	(6) <sup>c</sup>
constant	1.55*** (0.30)	1.78*** (0.57)	0.77 (0.55)	1.67*** (0.61)	2.41*** (0.65)	1.79** (0.81)
<i>mixed</i>		-0.22 (0.64)				
<i>dc</i>		-0.40 (0.53)				
<i>before 1970</i>			0.53 (0.55)			0.36 (0.45)
<i>1970s</i>			-0.69** (0.32)			-0.84*** (0.31)
<i>1990s</i>			1.18*** (0.35)			1.05*** (0.36)
<i>2000s</i>			-0.07 (0.53)			0.08 (0.55)
<i>working paper</i>				-1.42** (0.61)		-1.40** (0.57)
<i>no. of countries</i>				0.00 (0.01)		0.01 (0.01)
<i>panel data</i>				0.20 (0.54)		0.25 (0.51)

Variable	(1)	(2) <sup>a</sup>	(3) <sup>b</sup>	(4)	(5)	(6) <sup>c</sup>
<i>endogeneity</i>				0.31 (0.26)		0.27 (0.28)
<i>fixed effect</i>				0.41 (0.49)		0.67 (0.42)
<i>primary data</i>				-0.42 (0.53)		-0.50 (0.56)
<i>financial crisis</i>					-0.88 (1.02)	-1.27 (0.99)
<i>inflation</i>					-0.04 (0.39)	-0.13 (0.33)
<i>depth</i>					-0.64** (0.25)	-0.74*** (0.27)
<i>government</i>					-0.47 (0.50)	-0.52 (0.47)
<i>trade</i>					0.14 (0.37)	0.14 (0.27)
<i>investment</i>					-0.01 (0.42)	0.08 (0.39)
<i>institutions</i>					-0.46 (0.47)	-0.44 (0.45)
<i>human capital</i>					0.04 (0.33)	0.12 (0.40)

Variable	(1)	(2) <sup>a</sup>	(3) <sup>b</sup>	(4)	(5)	(6) <sup>c</sup>
<i>social indicators</i>					-0.56 (0.58)	-0.37 (0.49)
$\sigma_u$	1.84	1.89	1.72	1.73	1.87	1.62
$\sigma_e$	1.41	1.41	1.40	1.41	1.41	1.38
$R^2$	0.00	0.00	0.06	0.14	0.02	0.26
<b>M</b>	264	264	264	264	264	264
<b>N</b>	41	41	41	41	41	41

*Notes:* Standard error given in parentheses. \*\*\*, \*\*, \* denotes significance at the 1%, 5% and 10% level, respectively. There are no observations for *oecd* × equity (where equity refers to studies using one of the measures of equity market liberalisation) and bank × *mixed* (where bank refers to studies using one of the measures of bank sector liberalisation). M refers to the total number of observations and N represents the total number of studies.  $\sigma_e$  and  $\sigma_u$  stand for the within-study and between-study standard deviations, respectively. In the estimations, we account for clustering of the standard errors.

<sup>a</sup>The *oecd* variable has been omitted. The constant represents the effect of the omitted variable.

<sup>b</sup>The *1980s* indicator has been omitted.

**Table A4.4:** Omission of working papers after 2007

Variable	(1)	(2) <sup>a</sup>	(3) <sup>b</sup>	(4) <sup>c</sup>	(5) <sup>d</sup>	(6)	(7)	(8) <sup>d</sup>
constant	1.41*** (0.32)	1.65*** (0.61)	1.54*** (0.55)	2.27*** (0.62)	1.22** (0.59)	1.52* (0.81)	2.18*** (0.62)	1.99* (1.19)
<i>de jure</i>		-0.38 (0.71)						
<i>mixed</i>			-0.25 (0.70)					
<i>dc</i>			0.16 (0.48)					
<i>dejure</i> × <i>oecd</i>				-1.38 (1.14)				
<i>de jure</i> × <i>dc</i>				-1.47* (0.84)				
<i>de jure</i> × <i>mixed</i>				-0.93 (0.69)				
<i>de facto</i> × <i>dc</i>				0.03 (0.46)				
<i>de facto</i> × <i>mixed</i>				-0.89 (0.74)				
<i>before 1970</i>					0.79* (0.41)			0.61 (0.38)
<i>1970s</i>					-0.81*			-0.85*

Appendix 4.2: Results from additional robustness checks

Variable	(1)	(2) <sup>a</sup>	(3) <sup>b</sup>	(4) <sup>c</sup>	(5) <sup>d</sup>	(6)	(7)	(8) <sup>d</sup>
					(0.44)			(0.45)
1990s					0.92**			0.85
					(0.45)			(0.61)
2000s					-1.01*			-0.93*
					(0.57)			(0.53)
<i>working paper</i>						-0.69		-0.76
						(0.93)		(0.82)
<i>no. of countries</i>						-0.00		-0.00
						(0.01)		(0.01)
<i>panel data</i>						1.11		1.15
						(1.44)		(1.49)
<i>endogeneity</i>						-0.01		-0.10
						(0.33)		(0.35)
<i>fixed effect</i>						-0.90		-0.67
						(0.82)		(0.79)
<i>primary data</i>						-0.05		-0.13
						(0.33)		(0.32)
<i>financial crisis</i>							-0.22	-0.35
							(0.85)	(0.73)
<i>inflation</i>							-0.47	-0.63*
							(0.43)	(0.36)
<i>depth</i>							-0.89***	-0.90***
							(0.26)	(0.25)
<i>government</i>							-0.48	-0.39

Variable	(1)	(2) <sup>a</sup>	(3) <sup>b</sup>	(4) <sup>c</sup>	(5) <sup>d</sup>	(6)	(7)	(8) <sup>d</sup>
							(0.45)	(0.47)
<i>trade</i>							0.72	0.73*
							(0.46)	(0.42)
<i>investment</i>							-0.43	-0.30
							(0.49)	(0.38)
<i>institutions</i>							-0.64	-0.52
							(0.40)	(0.38)
<i>human capital</i>							-0.10	-0.05
							(0.45)	(0.50)
<i>social indicators</i>							0.10	0.16
							(0.59)	(0.54)
$\sigma_u$	1.98	2.00	2.02	2.05	1.85	1.93	1.99	1.84
$\sigma_e$	2.00	1.99	2.00	1.97	2.00	2.00	2.00	2.00
$R^2$	0.00	0.02	0.02	0.01	0.07	0.07	0.09	0.20
<b>M</b>	405	405	405	405	405	405	405	405
<b>N</b>	54	54	54	54	54	54	54	54

Notes: Standard error given in parentheses. \*\*\*, \*\*, \* denotes significance at the 1%, 5% and 10% level, respectively. There are no observations for *oecd* × *equity* (where *equity* refers to studies using one of the measures of equity market liberalisation) and *bank* × *mixed* (where *bank* refers to studies using one of the measures of bank sector liberalisation). *M* refers to the total number of observations and *N* represents the total number of studies.  $\sigma_e$  and  $\sigma_u$  stand for the within-study and between-study standard deviations, respectively. In the estimations, we account for clustering of the standard errors.

<sup>a</sup>The *de facto* measure has been omitted. The constant represents the effect of the omitted variable.

<sup>b</sup>The *oecd* variable has been omitted. The constant represents the effect of the omitted variable.

<sup>c</sup>The interaction *de facto* × *oecd* has been omitted. The constant represents the effect of the omitted variable.

<sup>d</sup> The *1980s* indicator has been omitted.



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