

# The Finance-Growth Nexus Revisited: From Origins to a Modern Theoretical Landscape

*Mikhail Stolbov*

## Abstract

The paper recounts the history of the finance-growth nexus research from its origins to the yearly 1990s. The contributions are analyzed in connection with the socioeconomic context and advances in economic theory. Many ideas first expressed decades ago are still subject to constant discussions and empirical checks, for example, causality direction between finance and economic growth which appeared on the agenda in the mid-1960s. Data improvement and theoretical advances, namely, breakthroughs in the economic theory of information in conjunction with endogenous growth models and growth regressions, shaped the modern landscape of this research program in the early 1990s.

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## Authors

*Mikhail Stolbov*, ✉ Department of Applied Economics, Moscow State Institute of International Relations, 76 Vernadskogo Prospekt, Moscow, Russian Federation, [stolbov\\_mi@mail.ru](mailto:stolbov_mi@mail.ru)

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## **1 Introduction**

Debates concerning the role of financial system in modern macroeconomics have intensified again. Scientific community and policymakers argue mostly about the role of finance in the Great Recession of 2008–2009. Meanwhile, the post-crisis recovery, though not robust enough and probably reversible, is under way. In this respect, the question of unleashing the potential of financial system to reach sustainable and high rates of economic growth inevitably comes to the fore. So, it seems timely to make a survey of the most important theories which shed light on the role of financial system in economic growth.

This analysis is also to mark the forthcoming 20<sup>th</sup> anniversary of King and Levine (1993) paper. It became a hallmark in the development of the finance-growth literature. It can also be considered as a symbolic threshold in this research program evolution. After its publication the research in the field has altered, both quantitatively and qualitatively. In regard to the quantitative change, a noticeable rise in the total number of papers has been observed. No doubt, it was fueled by greater data availability, incomparable to the period 1950–1980. The qualitative change primarily involves working on the issues, completely untouched on the previous stages of the research program development. The link between law, financial development and economic growth or the finance-growth nexus in resource rich economies may serve as plausible examples. The post-1993 overviews of the topic, e.g. Levine (2005) and Ang (2008), excellently discuss the modern state of affairs. However, most of the modern reviews and empirical papers are cursory with respect to the early stages of this research program development. This paper precisely seeks to fill this gap by reflecting on the inherent logic and external driving forces of the finance-growth literature from its origins to the yearly 1990s. The distinctive feature is that the contributions are analyzed in connection with the socioeconomic context and advances in economic theory. It is shown that the pre-1993 findings and insights are significantly incorporated in the subsequent literature.

The remainder of the paper is organized as follows: Section 2 describes the origins of finance-growth nexus theory up to the early 1900s; Section 3 is dedicated to its development in the first half of the 20th century; in Section 4 the determinants of the rising importance of this research program and its main contributions in the 1950s up to the early 1990s are discussed. Section 5 concludes.

## 2 Origins of the Theory

Walter Bagehot, a classical British economist and famous epigone of Adam Smith, was a founder of the theory under which the financial system is of great importance for economic growth. To a great extent, the appearance of Bagehot's work in the early 1870s in Great Britain appears logical. At that time she was a great world power with the most developed financial system.

Certainly, economists of earlier times also emphasized the significance of some components of a financial system in a modern sense of this word for the stable functioning of the economy. First of all, they implied money circulation. In this context it's worth mentioning, for instance, the contribution of Richard Cantillon, David Hume, Henry Thornton. In addition, a heated discussion between adherents of the so-called Currency School (Lord Overstone, Richard Torrens) and Banking School (Thomas Tooke, John Stuart Mill) concerning the aspects of money circulation was under way in the 1830s and the 1840s in Great Britain.

However, it was W. Bagehot who first gave a detailed and modern-like description of how processes in the financial sphere were related to the situation in the real economy in his work "Lombard Street: A Description of the Money Market" (1873). In this book a lot of examples demonstrate how the events on the British money market affect capital spillovers within the country in search of most profitable ways of its application. W. Bagehot (1873, p. 11–12) writes:

“Political economists say that capital sets towards the most profitable trades, and that it rapidly leaves the less profitable and non-paying trades... In England, ... the process would be visible enough if you could only see the books of the bill brokers and the bankers. Their bill

cases as a rule are full of the bills drawn in the most profitable trades, and *ceteris paribus* and in comparison empty of those drawn in the less profitable. If the iron trade ceases to be as profitable as usual, less iron is sold; the fewer the sales the fewer the bills; and in consequence the number of iron bills in Lombard street is diminished. On the other hand, if in consequence of a bad harvest the corn trade becomes on a sudden profitable, immediately 'corn bills' are created in great numbers, and if good are discounted in Lombard Street. Thus English capital runs as surely and instantly where it is most wanted, and where there is most to be made of it, as water runs to find its level..."

Then, Bagehot passes to reasoning how loanable funds encourage economic activity. They are held in banks unclaimed until some sector suddenly becomes very profitable. Then, the loanable funds are allocated to its development, but other sectors associated with it technologically also start booming. As a result, they receive a vast volume of funding. Gradually, this process spills over the whole economy. Virtually, in this reasoning we can well see a verbal model of multiplicative processes in the economy.

The end of the 19th and the beginning of the 20th centuries were marked by substantial structural shifts in the world economy, such as an intensive development of textile industry and railway construction. At that time the USA also began outperforming Great Britain in the global economic race and the industrial revolution in Russia, Germany and France was almost finalized.

Particularly in that period Karl Marx and his followers were making a valuable analysis of interrelation of industrial growth, processes of monopolization in the real economy and financial intermediation. In this connection R. Hilferding deserves a special mention as well as the Marxists' analytical contribution to the debates on finance-real economy interaction as a whole. He showed that at the turn of the 19th to the 20th century mutual interweaving of industrial and loanable (banking) capital had reached such depth that instead of two separate categories of capital it was reasonable to introduce the notion "finance capital" (Hilferding, 1981).

Thereby, finance capital was considered as a basis for establishing cartels and trusts with dominating role of banks or financial-industrial

groups, as we would today call such conglomerates. Since many big infrastructure projects of that time were carried out by cartels and trusts, one can argue that finance capital formation really contributed to economic growth. Nevertheless, it is also necessary to take into account negative effects which are immanent to the appearance of financial-industrial groups as such, i.e., losses in public welfare connected with market monopolization.

### **3 First Half of the 20th Century: Joseph Schumpeter and Keynesians**

Hilferding's analysis influenced other researchers. One of them was Joseph Schumpeter. That influence must have been a product of Schumpeter's interest in Marxist economics and personal friendship with Hilferding (Michaelides, Milios, 2005). In any case, Schumpeter's monograph "The Theory of Economic Development" first published in 1912 is recognized as the next stage of finance-growth nexus analysis. As it is well known, in the book he proposed "new combinations" that drive economic development. Schumpeter identified five forms of these combinations: 1) production of new goods; 2) applying new ways of production and commercial utilizing of the existent goods; 3) new commodity market development; 4) new sources of raw material development and 5) sector structure alteration (Schumpeter, 1982).

There are two ways to make the new combinations—by administrative power and by means of banking loans in case of a market economy. According to Schumpeter, the banker is an intermediary between those who strive for the realization of new combinations and owners of capital which is necessary to accomplish this aim. Thus, when a bank issues a loan, it authorizes the implementation of "the new combinations" in the name of the whole society. Banking activity is aimed at stimulating economic development. However, it implies the absence of centralized power that would exert exclusive control over social and economic processes.

At the same time it should be considered that according to Schumpeter bank loans are of a great importance just at the moment of creating "the

new combinations”, whereas in a steady state of the economy when firms have already had necessary means of production or are able to fill them up constantly due to the revenues from previous production, finance just plays an auxiliary role. In fact, the latter boils down to financial institutions’ participation in monetary mediation of immutable, regularly repeated routines.

Later Schumpeter must have adhered more firmly to the view that financial intermediaries facilitate economic development. Analyzing the nature of cyclical processes in “Business Cycles: A Theoretical, Historical, and Statistical Analysis of Capitalist Process” (2005) he underlined that the interrelation between the supply of bank loans and innovations had a fundamental meaning for the comprehension of “capitalist engine” running.

Nevertheless, Schumpeter’s idea of the positive role of banking institutions in promoting economic growth didn’t become widespread because “The Theory of Economic Development” was published on the eve of the First World War and was translated from German into English and French in 1934 when the USA and leading European countries were undergoing a severe recession. In such conditions the financial determinant of economic growth could scarcely receive comprehensive and unbiased attention. The Great Depression began from the massive stock market collapse and paralysis of banking sector. Hopes for a prompt rebound of the financial system either in the USA or in the Western Europe countries didn’t come true.

Processes in the real economy were considered to be first-priority and the development of financial sector was their consequence. Such idea found capacious expression in the words of J. Robinson who asserted that “enterprise leads finance” (Robinson, 1952). These scientific views largely explain the absence of outstanding works dedicated to the finance-growth nexus in the 1930s and 1940s.

It is noteworthy that those years were characterized by an accelerated appearance of the neoclassical synthesis on the leading positions in economics and economic policy. In the theories of the first followers of J. Keynes the financial system plays an important but not the primary role. Therefore, it is quite clear that the common wisdom was that financial

development was a by-product of economic growth rather than a force spurring it.

## **4 Re-emergence of the Finance-Growth Nexus as a Research Program: The 1950s up to the Early 1990s**

### **4.1 The 1950s and the 1960s**

However, since 1955 when the article “Financial aspects of economic development” (Gurley and Shaw 1955) was published in the AER, an interest of the scientific community in studying the influence of financial system on economic growth began re-emerging. The paper was innovative for its time, as it laid the foundations of a new methodology, integrating finance and growth issues, motivated by the fact that “...real or “goods” aspects of development have been the center of attention in economic literature to the comparative neglect of financial aspects” (Gurley and Shaw 1955, p. 515).

Gurley and Shaw asserted that the neoclassical synthesis as a whole and its Harrod–Domar growth models in particular had serious shortcomings. The authors pointed out that this analytical tradition “is not hospitable to the financial intermediaries whose development in recent decades has...marked commercial banking as a relatively declining industry” (Gurley and Shaw 1955, p. 524). This criticism hinged around both empirical findings by Goldsmith (1954), who had documented a nearly 30 percentage point decline of the US banking sector assets in relation to those of other private financial intermediaries (from 120,5 to 94,7%) over the period 1900–1949, and an obviously limited set of assets in any Keynesian model of that time–money and bonds.

According to Gurley and Shaw, banks are not unique in creating credit, and other financial intermediaries exert major influence on the optimal rate of money supply in any economy. Moreover, when discussing policy implications of their theory, they call for a full-fledged financial control to replace a traditional approach to monetary policy. In particular, they state that “the lag of regulatory techniques behind the institutional development of intermediaries can be overcome when it is appreciated that “financial

control” should supplant “monetary control.”... A monetary authority which is tempted to stay within the bounds of its traditional controls because they are quantitative, general, and impartial, may find itself more and more out of touch with credit developments in critical growth areas where lending by nonbank institutions is predominant” (Gurley and Shaw 1955, p. 537). These ideas were path-breaking in the mid-1950s and had very much in common with modern views on the monetary policy conduct. In this regard one should mention, for example, the endogenous money concept elaborated and actively disseminated by Post-Keynesian economists. However, it wasn’t easy for Gurley and Shaw to defend and promote their theory. It was subject to a heated debate, involving a number of critical comments (Culbertson, 1958, Marty, 1961), replies (Gurley and Shaw 1958) and further papers by the authors (Gurley and Shaw 1956, 1960, 1967) that specified the initial findings.

Meanwhile, economic historians also made a valuable contribution to the re-emergence of the finance-growth nexus as a research program.

In this context it is worth mentioning A. Gerschenkron (1962), who in his seminal work “Economic Backwardness in Historical Perspective” focused attention (quite in line with his predecessors) on the role of banking sector. According to his hypothesis, the level of economic development before the industrialization determines how significant the role of banking sector in this process should be. Thus, Great Britain, initially the most developed country, did not have to employ the full capacity of the banking system because of a comparatively low scale of required investments.

The situation was quite different in Germany and Russia where the industrialization in the second half of the 19th century required huge capital investments that predetermined the key role of the banking sector in economic development of these countries.

R. Cameron (1967) put a special emphasis on the quality and effectiveness of financial services. In his analysis Cameron pointed to the key features of financial systems that resemble modern classifications of its functions: 1) financial system redistributes resources from risk-averse economic agents to entrepreneurs; 2) financial intermediaries spur investments reducing borrowing costs, which leads to decreasing interest rate spreads across geographical and sectoral dimensions as well as to a



diminishing role of seasonality in investment fluctuations; 3) financial institutions facilitate an effective allocation of the initial stock of capital in the period of industrialization and contribute to technological advances.

Besides, Cameron carried out a comparative analysis of the interaction between financial markets and economic development of England, Scotland, France, Belgium, Germany, Japan and Russia in the 19th century. He showed that in Scotland, Belgium, Japan and Russia the financial system played a crucial role in the rapid industrial growth but in Germany and France this link was less pronounced mainly due to incoherencies in the economic policy.

In “The Theory of Economic History” J. Hicks (1973) noted that the industrial revolution in Great Britain at the end of the 18th century had become the result not so much of technological innovations as of the consolidation of the financial system which helped disseminate innovations across many sectors.

H. Patrick (1966) highlighted two modes of how financial development and economic growth could be intertwined, having dubbed them “demand-following” and “supply-leading”. “Demand-following” mode is a situation when finance adjusts to economic growth. In this case finance is “essentially passive and permissive in the growth process” (Patrick 1966, p. 175). “Supply-leading” approach implies that financial institutions accumulate savings and transform them into investments, which are necessary for the development of modern sectors of the economy. Patrick states that the “supply-leading” approach “is akin to the Schumpeterian concept of innovation financing” (Patrick 1966, p. 176). To the best of our knowledge, that was the first attempt to discuss the problem of causality in the finance-growth nexus literature. It is also necessary to note that the two modes of the finance-growth nexus are not isolated and the interaction between them tends to evolve with the stage of development:

“...the following sequence may be postulated. Before sustained modern industrial growth gets underway, supply-leading may be able to induce real innovation-type investment. As the process of real growth occurs, the supply-leading impetus gradually becomes less important, and the demand-following financial response becomes dominant. This

sequential process is also likely to occur within and among specific industries or sectors.” (Patrick 1966, p. 177).

Patrick also discusses the mechanics of the “supply-leading” phenomenon, explicitly building on the Gurley–Shaw model. He populates his verbal model with economic agents who take investment decisions from the portfolio choice perspective. They are endowed with both tangible (real) and financial assets. Then he shows how financial intermediaries help improve the initial allocation of assets across the agents, thus contributing to the overall productivity growth of capital stock.

Like Gurley and Shaw, Patrick touches upon certain policy implications related to the “supply-leading” phenomenon. In particular, he does not rule out the possibility that in developing countries it can be induced by public funds. To this end, the government may establish its own financial institutions or subsidize private ones. But under such framework the “supply-leading” approach should be handled with caution, as *“political pressures, bureaucratic inefficiencies, corruption, etc., can distort the flow of funds under government programs away from optimal allocation patterns”* (Patrick 1966, p. 186).

To draw some preliminary conclusions, by the early 1970s the finance-growth research had begun reviving, gradually returning on the pages of the most important journals and monographs. Though primarily verbal, with scarce formalization, it turned out to be internally coherent and insightful. The finance-growth literature of the 1950–1960s has become inspiring and widely cited by future generations of researchers. To illustrate it, the figure depicting the Gurley and Shaw (1955) paper cumulative citations suffices.

What the literature really lacked was empirical back-up. To secure it, it was necessary to develop a more or less universal system of financial development indicators for a wide range of countries. Inevitably, it would also lead to a rise in quantitative analysis of the finance-growth nexus. These developments did take place in the 1970s and the 1980s.

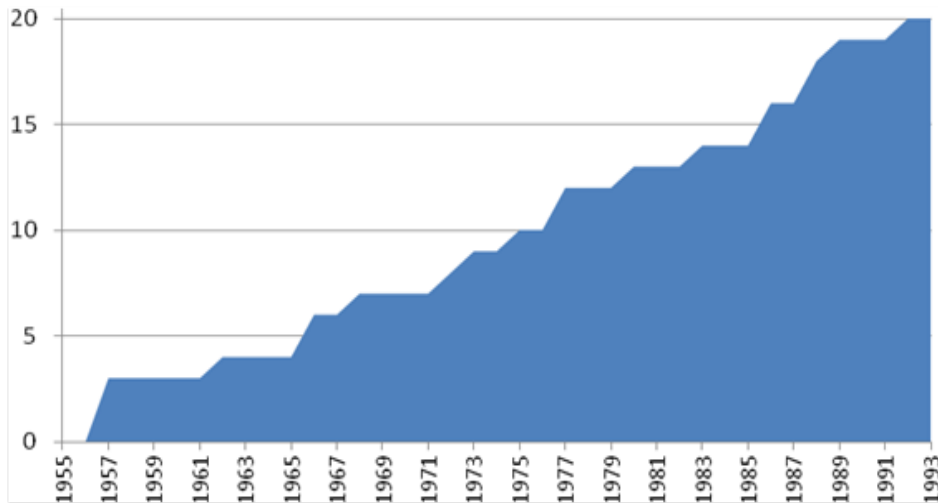


Figure. Cumulative number of the Gurley and Shaw (1955) paper citations, 1955–1993.

Source: JSTOR.

#### 4.2 The 1970s up to the early 1990s

The beginning of the 1970s was marked by fundamental research by R. McKinnon (1973) and E. Shaw (1973). These authors exposed to severe criticism the so-called financial repression, a kind of macroeconomic policy then largely pursued by many developing countries. In short, this policy implies interest rate ceilings, higher banking reserve rates and cross-border capital controls. So, it could be considered as an implicit tax imposed on financial institutions. Such policy is instrumental in terms of growing budget deficits and national debt. Without doubt, however, financial repression impedes the development of private financial institutions. Discussing its overall benefits and weaknesses is beyond the aims of the paper. C. Reinhart (2012) provides a thorough survey of this policy and its applicability in modern conditions. Here, we just emphasize that McKinnon and Shaw made a strong case for financial liberalization as a growth-

enhancing policy and refuted the financial repression policy. Since then this approach has been labeled the McKinnon–Shaw hypothesis.<sup>1</sup>

Both McKinnon and Shaw extensively used statistical data on financial development, but it was Goldsmith (1975) who outlined a comprehensive system of financial indicators<sup>2</sup>. Its main motivation is to provide “organized quantitative evidence to help in analyzing the contribution, or the lack of it, of a country’s financial system to its economic growth, stagnation, or decay, specifically the question whether and how the financial system has led, paralleled, or lagged behind economic development” (Goldsmith 1975, p. 216).

It consists of several building blocks. First and foremost, aggregate balance sheets and flow of funds statements for a country as a whole and

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<sup>1</sup> However, the contributions by the authors are not entirely overlapping and have their own peculiarities. McKinnon’s approach is famous for the so-called *complementarity hypothesis*. It refers to developing countries and implies that the major part of corporate investments in them is self-financed. Besides, it is assumed that most of the investments are indivisible, i.e. require funds accumulation in advance. Naturally, to boost such investments it is desirable to have an elastic money supply and, thus, to remove monetary restrictions, primarily interest rate ceilings fixed below the market level. This measure eventually leads to a rise in real deposit rates which become positive and to a more replenished reservoir of savings for future investments. So, money (money supply) and investments in McKinnon’s theory are complements. In the 1980s and the early 1990s there were a number of papers in favor of the complementarity hypothesis, proving that more relaxed monetary policy is an important, if not sufficient, pre-requisite for economic growth acceleration in developing countries. The examples include Harris (1979), De Melo and Tybout (1986), Laumas (1990), Thornton (1990a, b).

Unlike McKinnon, Shaw stresses the role of financial institutions development and does not confine financial liberalization to less restrictive monetary policy. Moreover, non-bank financial institutions may make up for a lack of institutional (bank) credit, when it is subject to price and non-price rationing. Thus, one can conclude that Shaw’s view is somewhat broader in comparison to the complementarity hypothesis.

There were attempts to quantitatively compare both approaches. For example, Fry (1978) analyzed the financial liberalization experience of 7 Asian economies in the 1960s and the 1970s and provided evidence in favor of Shaw’s financial deepening rather than McKinnon’s approach. But the overall popularity of McKinnon’s theory was higher, also because “the widespread use of vector autoregressions to analyze macroeconomic time series shifted the focus back to money as the key financial aggregate”, as Gertler (1988) put.

<sup>2</sup> In 1969, Goldsmith was the first to compute correlations between the ratio of financial assets to GNP and GNP per capita for 35 countries, revealing its positive sign and statistical significance.

for a number of financially important sectors are to be scrutinized. Also, the size and structure of assets and liabilities of all types of financial institutions, their distribution among different institutional sectors; data on concentration ratios, maturity, yield and security of financial instruments as well as a survey of relevant legislation should be covered. Goldsmith suggests that the most important indicator in the system should be the financial interrelations ratio (FIR) which measures the relative significance of the financial system within any economy and can be calculated as the ratio of the value of all financial instruments outstanding at a given date to that of national wealth at the same date (Goldsmith 1975, p. 226). If GDP or GNP is taken as a proxy of national wealth, we are to deal with a typical indicator of financial depth, speaking in modern terms. Interestingly, Goldsmith also attached vast importance to the penetration of the financial system, i.e. the number and distribution of financial institutions, their branches and customers. Again, now these measures are gaining momentum, supplementing those of financial depth, but the term “penetration” proposed by Goldsmith has been replaced with “inclusion”.

Anyway, the outlined system of financial development indicators was a genuine dream of researchers in the mid-1970s. The gaps were being filled gradually in the subsequent decade and a half, but primarily in regard to financial depth metrics. The process sped up significantly in the late 1980s when the World Bank launched its World Development Report in 1989 with an exclusive focus on financial systems and development. Shortly afterwards, the compilation of the core data received an enormous push, which in its turn boosted the relevant research in the middle and second half of the 1990s.

However, even in the absence of a comprehensive data on financial development during the 1980s a great number of interesting empirical papers and a new strand of theoretical finance-growth literature appeared.

As for the empirical contribution of the 1980s, one should mention a number of attempts to assess causality between finance and growth in the spirit of Patrick (1966) paper. Namely, there was Jung (1986) research which studied evidence on the causality between financial and real development for a sample of 56 countries, 16 of which were developed economies. He used the currency (M1/GDP) and monetization (M2/GDP)

ratios as proxies of financial development and applied Granger test to judge on the causality directions. His research revealed the predominance of the “supply-leading” pattern in case of developing countries, whereas the developed nations in Jung’s sample primarily exhibited the “demand-following” causality. The result was more convincing when the currency rather than monetization ratio was applied.

Darrat et. al (1989) ran similar causality tests, but focused on 4 countries that were “growth miracles”—Hong Kong, Taiwan, Singapore and South Korea. The analysis covered the period from the late 1950s to the mid-1980s, with M2/GDP being the measure of financial development. The research unambiguously established the “supply-leading” pattern in case of Hong Kong. Weaker evidence in favor of the hypothesis was found for Taiwan and Singapore, while in South Korea the “demand-following” mode between financial and real development was revealed.

Another work merits a special mention: in the 1984, Gupta (2011) was the first to use the simultaneous equations methodology (actually, VARs) to assess the causality between financial development and economic growth for 14 developing countries and again found support for the “supply-leading” pattern. The author did his best to overcome the lack of data and based his quantitative analysis on quarterly data for 1967–1977, which was a daring exercise for that time.

The wave of financial liberalization beginning in the vicinity of 1980 additionally encouraged theoretical and empirical research of the finance-growth nexus. Besides the financial liberalization, remarkable shifts within economics in the late 1970s and early 1980s led to a rising interest in this research program. The contributions to the theory of information were the most important. Thanks to Stiglitz, Greenwald, Weiss, Diamond, Dybvig and others, new approaches to modeling a macroeconomic role of banking began to penetrate and by the end of the 1980s reached their climax. They managed to express the peculiarities of financial activities in a formal language and thus operationalized such notions as principal-agent problem, moral hazard, adverse selection, screening, etc.

For example, Greenwald and Stiglitz (1989, 1991) show how financial market imperfections affect economic growth. They consider equity capital as an independent input to production and investment and allow this

resource to be generated endogenously by the interaction of financial and real markets. Eventually, they formally describe how financial markets with fewer imperfections lead to higher productivity of real capital stock and why there are no apparent decreasing returns to output growth. Stiglitz (1991) also discusses certain policy implications, advocating moderate public intervention in the process of financial development and criticizing the “extreme views”—free markets and interventionism.

In the late 1980s the theoretical finance-growth literature received another positive impulse. The modeling techniques related to the economic theory of information were transplanted onto the endogenous growth theory setting. It resulted in some interesting and influential papers<sup>3</sup>. For example, Bencivenga and Smith (1991) construct an endogenous growth model with multiple assets and demonstrate how financial intermediation (enhanced banking activity) may shift the composition of savings toward investment, thus being growth-promoting. Saint-Paul (1992) relates growth to higher degrees of specialization, which involves the risk of a sudden sectoral demand shock. Nevertheless, this shock can be mitigated or even completely absorbed by means of portfolio diversification via the stock market. Consequently, financial development may help firms exploit the benefits of higher productivity of production inputs due to specialization. Greenwood and Jovanovic (1990) link financial intermediation, growth and inequality, proving that there could be a  $\cap$ -shaped connection between economic development and inequality as the Kuznets’s hypothesis stipulates. Evans and Jovanovic (1989) establish that capitalist and entrepreneurial functions should be consonant to foster entrepreneurial activity better. In other words, would-be businessmen should initially be endowed with some wealth for their enterprise to be a success. This finding lends support to the “supply-leading” pattern, i.e. the binding liquidity constraint which prospective entrepreneurs face is to be relaxed first to

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<sup>3</sup> Here it is necessary to mention Townsend’s paper (1983) that has little to do with endogenous growth theory, but formally embeds finance in macroeconomic context. It is done by integrating monetary theory and general economic equilibrium theory. Townsend establishes that the degree of interconnectedness (for example, measured as the share of transportation, communication and commerce in GDP) between economic agents in a country facilitates financial intermediation and leads to more vibrant economic activity.

create the necessary basis for more vibrant economic activity and growth. In the field of policymaking, it provides rationale for microfinance as a growth-enhancing instrument in the least developed economies.

In his survey, Pagano (1993) presents a very simple and stylized model that generalizes the channels of the finance-growth nexus in the endogenous growth setting, based on AK model. The equilibrium rate of economic growth in this model is set by the formula  $g(Y) = A * \delta * s - d$  where  $A$  is the level of technology that according to the baseline model is above 1 (i.e. it exhibits a non-decreasing returns to scale),  $\delta$  - is a transformation ratio of savings into investments ( $0 < \delta < 1$ ),  $s$ —savings rate,  $d$ —rate of depreciation. Thus,  $A$ ,  $\delta$ ,  $s$  “capture” the influence of financial development on economic growth.

The availability of more comprehensive data on international financial development in the late 1980s and the early 1990s created new opportunities for the empirical analysis of the finance-growth nexus. The measures of financial development used in the research were more diverse than currency or monetization ratios. They directly dealt with credit depth and even stock market development<sup>4</sup>. The quantitative paradigm also changed: the causality tests were replaced by cross-section growth regressions. This approach is based on Barro’s ideas (Barro, 1991) who suggested a relatively simple econometric technique to assess growth determinants (the so-called Barro-regressions). The model adapted to evaluate the role of finance in economic growth looks as follows:

$$Y_{it} = \alpha_0 + \alpha * F_{it} + \beta * X_{it} + \varepsilon_{it},$$

where  $\alpha_0, \alpha, \beta$  are coefficients,  $F_{it}$  denotes an indicator of a country’s  $i$  financial system development (normally, one of financial depth ratios) at

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<sup>4</sup> As far as the role of stock market in economic growth is concerned, one should refer to Levine (1991) paper which identifies the ways through which stock market can accelerate growth: 1) by facilitating the ability to trade ownership of firms without disrupting the internal productive processes; 2) via portfolio diversification. Four years before, Cho (1986) embedded stock market in the McKinnon–Shaw logic, calling for a comprehensive approach to financial liberalization and criticizing a unilateral emphasis on banking sector. Atje and Jovanovic (1989) provide empirical evidence that the initial stock market development may exert more pronounced impact on subsequent growth rates than bank lending.



the moment  $t$ ,  $X_{it}$  indicates the values of controlling variables for a country  $i$  at the moment  $t$ ,  $\varepsilon_{it}$  denotes an error of the regression. We can speak about positive influence of the financial market on economic growth if the coefficient  $\alpha$  at the variable  $F_{it}$  is positive and statistically significant.

It has become natural to associate this approach with the seminal paper by King and Levine (1993)<sup>5</sup>. However, prior to its publication, there were some works that contained growth regressions with financial depth ratios. De Gregorio and Guidotti (1992) extend Barro's growth regressions for a sample of 98 countries during the period 1960–1985, using bank credit to private sector as a proxy of financial development. They find a robust positive effect of this measure of financial development on the long-run growth for this large sample. Then, they separately estimate the model for a sample of 12 Latin American countries in 1950–1985 and discover that the positive effect does not hold, thus hinting at possible pitfalls of pooled assessment and heterogeneous connection between finance and growth across regions. Ghani (1992) provides empirical evidence that the initial level of financial development is positively associated with a country's later GDP growth. His sample consists of 52 developing countries and covers 1965–1989. The initial level of financial development is given by total assets of financial institutions to GDP, with the initial values of human capital (years of schooling) and investment rate being controlling variables.

The paper of King and Levine (1993) adds a new point of view. It establishes that financial development is positively correlated with contemporaneous rates of economic growth, physical capital accumulation and economic efficiency improvements and is a good predictor of future values of these indicators over the next 10–30 years. The time coverage is from 1960 to 1989, with 80 countries in focus. The authors deal with 4 indicators of financial development, highlighting its different aspects.

The methodology and the sample coverage have become standard, turning the paper itself into a hallmark and threshold in the finance-growth literature. However, no doubt, besides its own merits, this paper symbolizes

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<sup>5</sup> It is not surprising as Ross Levine was also one of the contributors to the growth regressions theory. See, for instance, Levine and Renelt (1992).

the enhanced importance of the whole research program reached by the early 1990s and an array of promising avenues for future research which have been embarked on since then.

## **5 Conclusions**

The paper recounts the history of the finance-growth nexus research from its origins to the early 1990s. The socioeconomic context and theoretical achievements in economics have had substantial impact on the ups and downs of the research program. Despite its volatile development path, it has been internally wholesome and coherent. Many ideas first expressed decades ago are still subject to constant discussions and empirical checks, for example, causality direction between finance and economic growth which appeared on the agenda in the mid-1960s.

Over the 1970s and 1980s the finance-growth literature was a theoretical underpinning of the quest for financial liberalization, as it severely criticized the restrictive monetary and financial policies in developing countries of that time. Naturally, scarce empirical contributions were aimed at proving the inefficiency of financial repression and the positive effect of finance on growth. Judging from today's perspective they may not seem sufficiently convincing, as sample coverage was often limited and econometric techniques may have deviated from presently accepted standards. Data improvement and theoretical advances, namely, breakthroughs in the economic theory of information in conjunction with endogenous growth models and growth regressions, had shaped the modern landscape of this research program by the early 1990s.

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