

# Financial Centres Index and GDP Growth

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Received: February 22, 2016

Accepted: March 11, 2016

Online Published: March 25, 2016

doi:10.5539/ijef.v8n4p198

URL: <http://dx.doi.org/10.5539/ijef.v8n4p198>

## Abstract

This study investigates the relationship between financial centres index and GDP growth of 20 countries with the world's largest GDP. In our sample each country is represented by just one financial centre. We tested many models through several panel approaches. Use of a fixed-effects model, fixed-effects (within) regression, random-effects GLS regression, random-effects ML regression, and empirical findings showed that the global financial centres index variable is highly statistically significant, and coefficients obtained from different estimations are very close to each other. Our findings support the idea that financial centres positively affect the GDP growth of countries.

**Keywords:** fixed-effects models, GDP growth, global financial centres index, random-effects models

## 1. Introduction

A financial centre is “a cluster of financial service providers serving the requirements of either a region, a continent, or, indeed, the whole world, or as a central location where an area's financial transactions are coordinated and cleared” (Cassis & Bussiere, 2005, p. 1). The International Monetary Fund (IMF) (2000) classifies financial centres as having three parts: international financial centres (IFCs), regional financial centres (RFCs), and offshore financial centres (OFCs). An OFC provides limited specialist services and has the smallest scale of the three. RFCs develop financial markets with intermediate funds in and out of their region, but they have relatively small domestic economies. An IFC is a large, international, full-service centre with advanced settlement and payments systems supporting large domestic economies with deep and liquid markets. An IFC has a vital role in the global economy, payment systems, and financial interactions. As a result of globalization, enhancement in transportation and communication, and financial deregulation and liberalization, national capital markets have come to be replaced with supranational centres, and most of the financial operations are done in these centres. Although financial centres like New York and London dominate the system, there are also new centres such as Singapore, Seoul, and Dubai, and a new kind of financial division of labor has begun to emerge.

As a result of the 2007-2008 global financial crisis, confidence in financial institutions and financial tools eroded and financial centres throughout the world came under scrutiny. The core of the debate concerns the effects that financial centres have on the economy of the host country. Some researchers (Otusanya & Lauwo, 2012; Ulusoy & Karakurt, 2009) claim that financial centres are detrimental to national economies, and to support this idea they have put forward some negative factors such as money laundering in off-shore centres, an underground economy, and taking excessive risks for expected high returns. The other researchers think the opposite and contend that international financial centres contribute to financial and economic development (Hines, 2009; Kuah, 2008).

GDP growth has been one of the main concerns for academics, and since Adam Smith many growth theories have been put forward and numerous empirical studies have been conducted concerning them. Although there is no argument on the vital importance of growth, the optimum strategy for growth and set of determinants of the growth process have been under discussion. Since Bagehot (1873), many economists have acknowledged the importance of finance for economic growth. Moreover, with the globalization of finance and the founding of financial capitalism, the relationship between financial development and economic growth has received considerable attention. Studies focused on the endogenous growth model that states that the saving rate used for investment determines the steady-state growth rate (Pagano, 1993) and stresses the role of financial deepening in

growth. Also, it is widely believed that financial development enhances economic growth by providing better information about and monitoring of projects (Levine, 2004), making investment and capital allocation more efficient (Christopoulos & Tsionas, 2004), allowing investors better diversification and risk management (Levine, 1990), and facilitating the exchange of goods and services.

To investigate the effect of financial development on economic growth, researchers have used different proxies to quantify financial development such as money supply, international financial flows, depth-size and quality of financial institutions, domestic private credit, foreign direct investment, and stock markets. Some researchers have used control variables and expanded their models to include other factors in addition to financial development, to have a better understanding on financial development - GDP growth nexus. However, financial development goes hand-in-hand with many other developments such as urbanization, better transportation, and telecommunication systems. Therefore, expanding the model with some of these variables might cause a multicollinearity problem. Also, the direction of the causal relationship among these variables has been under discussion. In this respect, using a proxy for financial development that captures these factors, hence, to construct a small model, might be a second and useful approach.

It is observed that having a financial centre is an important asset for a nation to be competitive in the new global financial arena, which might contribute to the country's economic growth. This paper used a proxy, the Global Financial Centres Index (GFCI), to explore the relationship between financial development and economic growth for 20 selected centres: Amsterdam, Frankfurt, Hong Kong, Istanbul, Jakarta, London, Madrid, Mexico City, Milan, Moscow, Mumbai, New York, Paris, Sao Paulo, Riyadh, Seoul, Sydney, Tokyo, Toronto, and Zurich by using panel approaches. The GFCI takes into account many factors to rank financial centres, and we expected to find a strong, positive relationship between global financial centres index and economic growth.

The remainder of this article is organized as follows. The next section is a literature review. Section three explains data, econometric methodology, and provides empirical findings. The last section concludes.

## 2. Literature Review

The single most important thing to decrease poverty and to improve quality of life is economic growth. For this reason economic growth has been one of the main concerns not only of economists but also anthropologists, sociologists, and political scientists. Also, this concept has been at the top of the agenda for politicians and policymakers. Especially following the first industrial revolution and then the globalization process, the importance of economic growth has become vital. One the one hand, these two historical breakthrough events made the world extremely competitive, which increased the gap between rich and poor nations, and continues to do so. On the other hand, they have given hope to less-developed nations with subpar living-conditions that they could catch up with developed countries through rapid economic growth.

Many scholars have believed that economics was born as a science as a result of a seminal work by Adam Smith, *Wealth of Nations*, in 1776. Smith systematized economic growth problems and started the debate that has lasted for almost 3 centuries. Following Smith, researchers have established several theoretical frameworks of economic growth. During the 20th century many prominent economists, some of whom are Nobel Prize winners, investigated the main drivers of economic growth (Hayek, 1944; Lewis, 1954; Solow, 1970; Romer, 1986; Krugman, 1997; Easterly, 2003) and put several factors forward to explain the process. However, there is still dissidence among economists and policy makers over this matter.

On the one hand, countries with a high level of growth share some characteristics. On the other hand, careful investigation shows that each country has different and sometimes confusing experiences. There is no unique and prescribed route for growth, and countries can reach a high level of economic growth rate by adopting different and even conflicting policies. Because of this, many factors have been put forward as main drivers of economic growth including: (a) culture and religion (Sala-i-Martin, 1997); (b) good luck (Easterly, Kremer, Pritchett, & Summers, 1993); (c) foreign direct investment (FDI) (Lucas Jr, 1993; Romer, 1993; Carkovic & Levine, 2002; Chauffour & Hoekman, 2013); (d) trade liberalization (Sachs, Warner, Aslund & Fischer 1995; Rodriguez & Rodrik, 2001; Barro & Sala-i-Martin, 2004); (e) financial openness (Francois & Schuknecht, 1999); (f) services trade (Karam & Zaki, 2015); (g) international shocks (Rand & Tarp, 2002; Didier, Hevia, & Schmukler, 2012; Poshakwale & Ganguly, 2015); (h) institutional factors and weak institutions (Nelson, 2007; Bocchi, 2008); (i) oil prices (Hamilton, 1988; Zhang, 2008); (j) energy consumption (Lee, 2006; Belloumi, 2009); (k) nuclear energy (Aslan & Çam, 2013); (l) sovereign debt (Reinhart & Rogoff, 2010; Lof & Malinen, 2014); and (m) electricity consumption (Yuan, Kang, Zhao, & Hu, 2008). For the last several decades financial development has gained importance, and its effect on economic growth (King & Levine, 1993; Al-Yousif, 2002; Hur, Raj, & Riyanto, 2006; Shahbaz, 2009; Lartey, 2010; Zhang, Wang, & Wang, 2012; Barajas, Chami, & Yousefi, 2013; Shahbaz &

Rahman, 2014) and reducing poverty (Jalilian & Kirkpatrick, 2005; Uddin, Shahbaz, Arouri, & Teulon, 2014; Boukhatem, 2015) has been investigated intensely.

Parallel to the increasing importance of financial development on economic growth, the effects of financial centres have been added to the academic agenda. There are many studies about financial centres, some of which analyzed different cities such as 12 cities in the Asia-Pacific region (Liu & Strange, 1997); Moscow (Abramov, Polezhaev, & Sherstnev, 2011); Shanghai (Zhao, 2013); Hong Kong and Singapore (Wong, 2013); Istanbul (Şahin, 2013; Teker & Teker, 2011); Monaco, Jersey, Guernsey, Cayman Islands, Isle of Man, and British Virgin Islands (Geamanu, 2014); and Tokyo (Mckay, 2014) as financial centres with their advantages and disadvantages by considering their instrumental factors such as human capital, financial potential, business environment, regulation, and legislation. However, there are few empirical works that discuss the relationship between financial centres and such factors as volatility, financial development, and investments. Rose and Spiegel (2009) found that remoteness from major international financial centres increases macroeconomic volatility. According to Zhao (2013), great financial centres confer significant global influence on countries in which they are located.

### **3. Data, Methodology and Empirical Findings**

#### *3.1 Data*

Macro economic datas are obtained from the Thomson Reuters Datastream database. The series are in semiannual basis for the period of 2009-2015. M2 is the money supply and GE is the government expenditure. The GFCI index is the powerful index that covers many possible factors that affects the GDP. The main motivation behind using M2 and GE variables is to control for other factors that affect the growth. In this respect, it has been found out that M2 and GE are not covered by the index. Money supply and government expenditure are important macro variables, which have essential role in an economy.

The Global Financial Centres Index data are obtained from the Long Finance which established in 2007 by Z/Yen Group in conjunction with Gresham College, London. The GFCI has been published twice a year since 2007, but datas of the world's largest 20 economies are only available starting from 2009. 'To rate and rank the centres, we used two sets of information: instrumental factors and financial centre assessments. Instrumental factors are classified into five main categories: business environment, financial sector development, infrastructure, human capital, and reputational & general factors' (GFCI, 2015). Each category consists of many factors. For example, business environment-related instrumental factors include corporate tax rates, corruption perception index, government debt as a percentage of GDP, real interest rates, political risk, press freedom, and operational risk rating etc. Financial sector development-related instrumental factors include broad stock index levels, external positions of central banks as a share of GDP, percentage of firms using banks to finance investment, and total net assets of mutual funds. In total, the five main categories include 105 different factors. Some of these factors are macroeconomic variables such as GDP per person and price levels, and many of these factors are indices such as the global innovation index, business confidence index, and quality of life index. So the GFCI is a combination of some economic variables and indices, and it can be named as an index of indices. Information is collected from many sources including the World Bank, the Bank for International Settlements, Organisation for Economic Co-operation and Development (OECD), Central Intelligence Agency (CIA), Standard & Poor's, the United Nations, the United Nations Conference on Trade and Development (UNCTAD), the Brookings Institution, the Economist, and the World Economic Forum. Financial centre assessment is done through an online questionnaire for international financial services professionals. So the index takes into account the prospects and expectations of some important market participants on the competitiveness of the centres.

We chose our samples from the 2014 World Bank GDP ranking list. The first 20 countries on the list were: the United States, China, Japan, Germany, United Kingdom, France, Brazil, Italy, India, Russian Federation, Canada, Australia, Republic of Korea, Spain, Mexico, Indonesia, Netherlands, Turkey, Saudi Arabia, and Switzerland. In this sample each country is represented by one financial centre. For example the United States has centres in Chicago and Boston, but it is represented by its biggest financial centre, New York, according to the GFCI ranking list. Financial centres in our sample are New York, Hong Kong, Tokyo, Frankfurt, London, Paris, Sao Paulo, Milan, Mumbai, Moscow, Toronto, Sydney, Seoul, Madrid, Mexico City, Jakarta, Amsterdam, Istanbul, Riyadh, and Zurich.

#### *3.2 Methodology*

This study investigated the relationship between the GFCI and economic growth, for which we employed several panel approaches, including the fixed-effects model, fixed-effects (within) regression, random-effects GLS regression, and random-effects ML regression. To this aim several model specifications are used. To construct a panel, data cross sections are observed at several points in time. If it is believed that an independent variable is

affected by some unobservable variables those are correlated with the observed independent variables using panel data approach is preferable. By using panel data analysis we could control unobserved variables. One of the most important properties of panel data analysis is that it accounts for individual heterogeneity. In case of heterogeneity among cross sections, heterogeneity should be accounted for by using either dummy variables or different equations. The effect model is a simple way to account for heterogeneity and fixed effects, and random effects models are the two most commonly used methods for panel data.

The first question arises regarding effect model is whether to use fixed or random effects model. Fixed-effects regression (Mundlak, 1978; Judge, Hill, Griffiths, Lutkepohl, & Lee, 1988) is used to control some properties of the variable that might affect dependent variables so that the net effect of the independent variables on the dependent variable can be observed. As Kohler and Kreuter (2005, p. 245) stated, “the fixed-effects model controls for all time-invariant differences between the individuals, so the estimated coefficients of the fixed-effects models cannot be biased because of omitted time-invariant characteristics”. Using fixed effect is equivalent to adding dummy variables in the regression model to capture fixed-case effects. If the data time dimension is short but has many cross-sectional units, fixed-effects methods will consume degrees of freedom, so this method might be impractical. It is preferable to use fixed-effects when T is long and N is small. Meanwhile, the random effect model (Balestra & Nerlove, 1966) assumes that individual effect is random, and a country is treated as a random variable that is a sample of the population of all countries. Thus, “the crucial distinction between fixed and random effects is whether the unobserved individual effect embodies elements that are correlated with the regressors in the model, not whether these effects are stochastic or not” (Greene, 2008, p. 183). Although, theoretical properties of these two models have been investigated intensely and well-documented (Arceneaux & Nickerson, 2009; Kreft, Kreft, & De Leeuw, 1998; Wilson & Butler, 2007), Gelman and Hill (2007) argue that guidelines for the empirical researchers to choose the appropriate method for the sample under investigation are confusing and even worse contradictory. These guidelines are mostly based on idealized dataset so they might be misleading under different circumstances (Clark & Linzer, 2015). These models have strong assumptions some of which might be violated by real world data. Different conditions might bring a trade-off between unbiasedness and efficiency. Therefore, researchers are having difficulty to choose the best modelling approach.

One approach for this selection is to use a formal econometric testing procedure. Probably the most widely used procedure to select an appropriate model is Hausmann (1978) test whose null and alternative hypothesis are, the appropriate model is random effects and fixed effects, respectively (Greene, 2008). A significant test result implies that fixed effect model is the suitable one. However, this procedure has been criticized by many researchers for several reasons. First, there are several theoretical considerations about this selection procedure. For example, if underlying assumptions of the models are violated Hausman test may not be a useful statistical procedure to decide whether fixed or random effects model is more suitable for the data at hand (Wooldridge, 2010). Under these circumstances, significant test results in favor of the fixed effects model will be misleading which means Hausman test is not a reliable tool for this purpose (Fielding, 2004; Clarke, Crawford, Steele, & Vignoles, 2010). Also, it is claimed that to choose between fixed and random effects is not just a theoretical issue but researchers should take into account some practical issues as well (Clark & Linzer, 2015).

These explanations show that choosing between fixed and random effects models has several difficulties and even the most widely measure may not provide unbiased results. In this article our primary concern is to investigate the effect of GFCI on economic growth. Even though, Hausman test results imply that random effects model is more appropriate, taking into consideration model selection problems and criticisms about Hausman test, we also report random effects model results to refrain from any possible theoretical model selection discussion. This approach is useful for all practical purposes. Also, because of the result of two approaches do not contradict, there will be no concern about the reliability of the results.

### 3.3 Empirical Findings

To investigate the relationship between economic growth and the GFCI first of all we employ fixed and random effect models. With random effects model two different estimation procedures are used, namely Random-effects GLS and Random-effects ML regression. Random-effects GLS test carries the random-effects estimator and is a weighted average of the estimates which obtained by the between and within estimators. The result based on assumption that there is no-correlation. Compare to the between estimator the test provides efficient results. Random-effects model using maximum likelihood estimator: test requests the maximum-likelihood random-effects estimator, no constant. These tests are carried to see the result with the intercept and without, and mainly with the maximum probability of the estimators out of whole population. All three estimation provides us similar results. GFCI variable is highly statistically significant and coefficients obtained from different

estimations are very close to each other.

Table 1. Relationship between GFCI and GDP growth

	Indep. Var.	Coef.	t	P> t
Fixed-effects Model	GFCI	9655.415	7.40	0.000
Random-effects GLS Regression	GFCI	9512.948	7.27	0.000
Random-effects ML Regression	GFCI	8732.669	6.61	0.000

The GFCI includes a lot of variables and by using them creates an index. It is expected that it can explain economic growth of the countries. To see whether our results are robust we also include M2 and GE as control variables in our model. As can be seen from the Table 2 result is still in accordance with our previous findings. The GFCI variable is highly significant for all three regression and coefficients are close to each other. The interesting point is other variables those are widely acknowledged as determinants of economic growth become insignificant. This might be due to huge data set used by the GFCI.

Table 2. Relationship between GFCI and GDP growth with control variables M2 and GE

	Indep. Var.	Coef.	t	P> t
Fixed-effects (within) Regression	GFCI	11562.85	6.91	0.000
	M2	0.445184	1.18	0.237
	GE	-2.347555	-1.09	0.276
Random-effects GLS Regression	GFCI	11337.25	6.79	0.000
	M2	0.459540	1.23	0.218
	GE	-2.319445	-1.08	0.279
Random-effects ML Regression	GFCI	10397.87	6.16	0.000
	M2	0.506166	1.35	0.176
	GE	-2.310573	-1.08	0.279

Note. M2=money supply; GE=government expenditure.

As a last step we include one more variable which is accepted one of the main determinants of economic growth. This variable affects the coefficient of the GFCI but all other findings are still relevant.

Table 3. Relationship between GFCI and GDP growth with control variables M2, GE and NEX

	Indep. Var.	Coef.	t	P> t
Fixed-effects Model	GFCI	2733.836	4.42	0.000
	M2	-0.081539	-0.35	0.728
	GE	1.279419	0.88	0.380
	NEX	-0.911736	-1.60	0.112
Random-effects GLS Regression	GFCI	2726.118	4.45	0.000
	M2	-0.090845	-0.39	0.694
	GE	1.297906	0.91	0.365
	NEX	-0.919832	-1.63	0.104

Note. M2=money supply; GE=government expenditure; NEX= net export.

#### 4. Conclusion

This paper examined the relationship between GFCI and GDP growth for the countries that have the largest GDP according to the World Bank ranking table of 2014. In this sample, each country is represented by one financial centre. We tested whether global financial centres index (GFCI) has an effect on the GDP growth of the countries in our sample. According to all test results, the GFCI variable is highly significant for all models.

Rose and Spiegel (2009) offered that remoteness from major international financial centres increases macroeconomic volatility. Creel, Hubert and Labondance (2015) claimed that financial instability has a negative

effect on economic growth. So with these two studies taken together, it seems that with the distance of financial centres, macroeconomic volatility increases, which leads to economic instability and hinders economic growth. The literature has widely claimed that there is a strong relationship between financial centres and economic growth. Our findings are compatible with these theoretical expectations and show that the GFCI is strongly related to the economic growth performance of the country.

In addition to low financial volatility, financial centres establish a healthy environment for economic growth. More financial centres bring better financial investment opportunities, which helps the centres to attract financial resources. Higher foreign capital, especially in the form of FDI, helps countries to increase their production capacity in goods and services sectors. Financial centres also provide financial depth and breadth. In this way, local companies can benefit from having better access to financial resources and increase their leverage by using different financial instruments.

Financial centres are characterized by the presence of an advanced technological infrastructure and strong human resources. The advanced technology and skilled human resources of the financial centres have a spillover effect on other parts of countries in the long run, so these centres are like growth engines of the countries.

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