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Impact of size of the National Asset Funds on Economic Development: Panel Data Analysis on Select Nations

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Abstract. National asset funds are introduced to use the current transaction surplus, except the official reserves, in the most effective way possible. It is possible to cite the sources of these funds as commodity and non-commodity sources. The initial practices have been seen in oil-rich Gulf countries as well as Asian nations which have been successful in export activities. There are different national asset funds in a number of countries in the world exhibiting different management styles. The primary goals include ensuring sustainable development, creating sources, conducting development projects and accumulating savings for future generations. In addition, they are also used to deal with possible economic crises. But these funds are being criticized because they are allegedly not transparent and they can be used as independent budget by governments. Currently, the impacts of these funds upon economic growth have been a matter of academic curiosity. The purpose of this paper is to analyze the impact of the size of the national asset funds upon economic growth by reliance on a panel analysis of six nations employing asset funds. The findings in the analysis show that increase in the size of the national asset funds has a positive impact upon economic growth of the nations.

Keywords. National asset fund, Economic growth, Panel data analysis.


JEL. C10, C20, G23, O40.


1. Introduction

Although the initial examples of the national asset funds can be traced back to the 1950s, there has been no significant study on their impact in the literature up until 2005. Recent interest in the functions and roles of these assets reveals that this subject matter attracts both scholarly and practical attention (Cohen, 2009). One of the reasons for this growing interest is the increased size of the national asset funds. Additionally, the national asset funds have been a major source of funding in the world, leading to an increased attention (Murtinu & Scalera, 2016). The global size of the asset fund (as of last quarter of 2016) was \$7,396 billion (SWF, 2016).


There have been different definitions of national asset fund, offered by institutions, academics and practitioners. A think-tank based in the UK, Think Tank UK (TTUK), refers to the national asset fund as investment fund controlled by the government to fulfil some special goals. To this end, a national asset fund can be used to address some fiscal goals and problems, budget deficit and management of some financial assets and revenues out of privatization and other financial transactions (Ander & Tepley, 2014). Another definition suggests that a national asset fund is an asset controlled by national administrations to ensure investment in both domestic and international markets (Murtinu & Scalera, 2016).


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Investment funds, including foreign financial assets, owned by the state, can also be considered a national asset fund (Bertoni & Lugo, 2014). Based on these definitions, it is possible to underline some basic characteristics of a national asset fund: they are owned by national government, refer to administration of portfolios other than official reserves and include overseas investments (Shemirani, 2011).

A number of countries have established national asset funds, including Norway, Germany, France, Italy, Saudi Arabia, Qatar, Oman, United Arab Emirates, China, Singapore and South Korea. National asset funds may include different resources including oil, natural gas (particularly for Gulf states) as well as diamond and copper (for instance, Chile). In addition, revenues out of foreign trade transactions can be transferred to national funds (as in China and Singapore (Bernstein, Lerner & Schoar, 2013).

Detailed knowledge on the structure of the national asset funds and their potential is of critical importance for several reasons. Above all, investment funds play a critical role in the global economy. The 2014 data reveals that the total amount of assets administered by the funds exceeded \$6 trillion. Secondly, national asset funds played a global role in the re-regulation of the capital structures and outlooks of the Western banks after the 2008 financial crisis; this role made the funds important players in natural resources, real estate, transportation and public services. In addition, as part of learning mechanisms, national asset funds are focused on managing more complicated asset types such as infrastructure services, private capital and real estate. Moreover, investment trends offered by the national asset funds are directed at not only the industrial and developed nations but also at the developing nations as well. For instance, Temasek, a Singapore-based national asset fund, holds \$17 billion of bonds in Chinese banks. Finally, national asset funds play an important role in the economic transformation of the nations. For instance, Mubadala Development Company, created by the Abu Dhabi government, made an important investment in air transportation industry through its foreign partners (Aguilera, Capapé, & Santiso, 2016).

2. Historical perspective

The initial examples of the national asset funds is Permanent School Fund, created in Texas, US, in 1854, followed by Permanent University Fund in 1876 in the same state. Both funds were created to offer resources for education institutions. The fund created by the Kuwaiti government in 1953 is the first example of the national asset funds that we know today. This fund, created to administer the oil revenue surpluses, was designated as a public administration in 1983 and renamed Kuwait Investment Authority (KIA) (Alhashel, 2015). In 1956, the British administration in Gilbert Island established Kiribati Revenue Equalization Reserve Funds to better use resources associated with the phosphate exports. These two initial asset funds were followed by Temasek Holdig of Singapore in Singapore in 1974, Permanent Fund in Alaska, the Mubadala Development Company of Abu Dhabi and Albert Heritage Fund of Canada in 1976 (Das, 2009).

There are currently 78 national asset funds in the world, administering \$7,423 billion. Most of these funds (52 out of 78 national asset funds) were created after 2000 (SWF, 2017). The success of relatively small asset funds raised hopes for other nations to create their own national asset funds. On the other hand, the increased flow of capitals into these nations has become an important factor for the visibility of national asset funds (Lyons, 2009). Overall, national asset funds have grown by 21.5 pct in the world in the period of 2010-2015. The total amount of the funds are expected to reach \$15 trillion with the addition of 21 other funds through 2020 (Karagöl, & Koç, 2016).

Table 1 exhibits ten largest national asset funds in the world, along with the date of foundation and amount of funds they administer. Given that most of the countries in Table 1 have a small population size, the product diversity remains poor and limited. It is being observed that the funds have two main types of

resources: commodity resources include oil, natural gas and natural resources whereas non-commodity sources include privatization revenues, export surpluses and saving funds.

Table 1.10 Largest National Asset Funds in the World (Milyar USD)

Country	Name of Fund	Value	Year Founded	Base source
Norway	Government Pension Fund	850	1990	Oil
China	China Investment Cooperation	813.8	2007	Non-commodity
UAE	Abu Dhabi Investment Authority	792	1976	Oil
Kuwait	Kuwait Investment Authority	592	1953	Oil
S. Arabia	SAMA Foreign Holdings	582.4	1952	Oil
China	SAFE Investment Company	474	1997	Non-commodity
HonKong	Hong Kong Monetary Authority Invest. Portfolio	456.6	1993	Non-commodity
Singapore	Government of Singapore Invest. Corporation	350	1981	Non-commodity
Qatar	Qatar Investment Authority	335	2005	Oil
China	National Social Security Fund	295	2000	Non-commodity

Source: [Retrieved from].

3. Relationship between economic growth and national asset fund

Economic growth can be defined as sustainable increase of the production per capita through structural changes and population increase (Kuznets, 1966). Economic growth plays a crucial role in the attainment of social and economic goals of both developing and developed nations. Economic growth is one of the most important indicators for the positive and negative changes in the social and economic welfare and prosperity of the countries.

Economics which emerged as a science in the aftermath of the industrial revolution created different schools since the 18th century; almost all these schools have focused on the issue of economic growth. The growth theories these schools have developed have contributed to the development processes of the national economies. National asset funds make positive contributions to the economic growth processes of the countries through their impacts upon currency, public debt, technological innovation and other macro economic factors. In the literature of economics, investments are considered main determinants of growth; investment is, like many other factors, relevant to interest rates. Lack of confidence in the markets in the financial crisis periods often leads to increase in the interest rates due to uncertainty on the future.

National asset funds, with their long term investments and strong capital outlook, assume crucial roles of regulating financial markets by removing the possible risks at the CDS /credit default swap) and the stock rates of the international banks in times of financial fluctuations (Beck, & Fidora, 2008). Because the national asset funds are unable to perform leverage transactions in the markets they make investment in, it is very unlikely to observe transactions that would require closure of positions such as withdrawal of investments (Kimmit, 2008). The asset funds, for this reason, offer an impact of stabilization and modernization by alleviating the price fluctuations and reducing the liquidity risk premiums (Keller, 2008).

It is well-known that there is clear connection between currency rates and economic growth. Volatility in the currency rates may cause negative impact upon foreign trade and investments, main dynamics of economic growth, and therefore, restricts the production activities, leading to negative effects on growth in the long term (Eichengreen, 2008). On the other hand, currency rate volatility poses risks of hedging due to transaction costs and uncertainty. From a long term perspective, currency volatility weakens competitiveness in the export and import sectors of the domestic industries. To this end, any approach that allows stability in currency rate prevents strong declines, causing negative impacts upon growth (Schnabl, 2007). National asset funds have the power of stabilizing currency rates thanks to the size of their funds and investments overseas. The national asset funds use US dollar as foreign currency which enables them to serve as some sort of stabilizer to prevent any major fluctuations. On the other hand, the national funds hold the fund capitals

in terms of foreign currency, increasing the value of the local currency and thereby ensuring that the export-based sectors do not suffer from lack of competitiveness (Selfin, Snook, & Gupta, 2011).

Inflation is another macroeconomic factor that has impact upon growth. The inflation rate which tends to increase due to various reasons including expansion of money supply, supply shocks and inability to introduce necessary arrangements in taxation leads to deterioration in the real sector. In other words, the expected and unexpected inflation rates negatively affect the effective price mechanism and the factor efficiency, causing poor economic growth (Fischer, 1983). To this end, national asset funds transfer their funds to fertile investment areas, helping reduce the inflationist pressures associated with inflow of capitals (Gomes, 2008). In economies based on natural resources, increases in the prices of natural resources create inflationist pressure through affecting domestic demand. Over-valuation in the real currency rates associated with these pressures improves the external asset position of the asset funds, contributing to the protection of the price stability in the long term (Al-Hassan, *et al.*, 2013).

Internal growth theories argue that there is connection between research and development-based technological development and economic growth (Petraikos, Arvanitidis, & Pavleas, 2007). The rapid globalization in the aftermath of the 1980s greatly contributed to the technological advancement process (Bhalla, 2012). Technological advance ensures access to new products and production methods and the innovation in production techniques contributes to economic growth (Petraikos, Arvanitidis, & Pavleas, 2007). Asset funds, created by developing nations relying on a few commodities or revenues out of economic activities, ensure transfer of technology through transactions in developed nations in order to diversify their production activities (Makhlouf, 2010).

4. Theoretical framework of national asset funds

A review of the ten largest asset funds in the world (see Table 1) reveals that their capital structures are based on two factors: collective commodities such as oil, natural gas and mines and non-commodity assets such as export revenues and privatizations. Nations with rich natural resources have to make wise decisions in order to effectively use the revenues they make out of these resources. Such a decision has to consider exploration of consumable resources, use of the resources for proper investment and other similar variables (Reisen, 2008). Hotelling and Hartwick theories focus on optimal administration of the natural resources (Mochebelele, 2013).

Hotelling rule refers to a comparative analysis of the revenues out of the sale of natural resources including oil, natural gas and others, and the future sale of these products associated with the investment of these resources. In case the revenues associated with the investments based on the sale of the natural sources remains below the future price of the natural resources, the natural resource exporter will reserve the revenue for consumption or decide not to extract the natural resources. To this end, the national asset funds redirect natural resource revenues to investments, thereby contributing to the increase of current revenue out of the natural resource and preventing supply shocks associated with the possibility of excessive revenue out of the natural resources (Reisen, 2008).

In a society of production under the assumption that there is no technological advance with a certain amount of capital stock, fixed workforce supply and fixed revenue, workforce and capital is utilized to the fullest extent; in accordance with the Hotelling rule, the price of one unit of the raw natural resource is equal to the marginal product of the renewable capital. Such a society follows a specific investment policy in this environment; in other words, it makes investment upon renewable capital goods, trying to ensure that the natural resource is not exhausted. In this way, the renewable capital compensates the declines in the use of the natural resources (Solow, 1986).

The Hartwick rule refers to the requirement that the available resources should be transferred to capital accumulation to ensure fixed income level where there is no population increase. In case consumption per capital shows tendency of increase over the time, social welfare can be improved only through saving and investments rather than consumption.

In other words, Hartwick rule suggests that revenues associated with natural resources extracted from earth lead to decline in the capital unless they are rechanneled in investment. To this end, the diminishing returns rule indicates that the oil-exporting countries need to invest their revenues out of the country. In addition, the national asset funds assume a stabilizing role in the price fluctuations of the raw materials (Reisen, 2008).

Given the activities, operations of the national asset funds and their performance within the economy, theories on trade revenues are considered part of the foreign business theories; international trade theories are classified in the field of modern portfolio theories and stewardship theory (Chioma, Uche, & Bassey, 2014). International trade plays a determinative role on national income. Parties to the international trade perform their transactions through foreign currency; due to these transactions, they either produce surplus or deficit in their balance of payments. International trade ensures that the states will have access to more goods and services. States in the world have to rely on highly convertible currencies to perform their trade activities. Volatilities that could be observed in the foreign trade volumes of the countries due to some economic uncertainties force the central banks to hold currency reserves. In addition, national governments seek to hold excess currency in their balance of payments to preserve financial stabilization in face of potential fluctuations in the macroeconomic variables including currency changes, interest rates and inflation rate (Al-Saidi, 2012). These excess reserves are expected to serve as important secondary sources for the funds in the creation of the capital structures of the national asset funds. Modern portfolio approach, on the other hand, seeks to maximize the amount of the expected portfolio revenue in connection with a certain amount of portfolio risk or minimize the risk in connection with a certain amount of expected revenue by offering a portfolio of various assets. Theory suggests that assets should be diversified to offer protection for specific market risks (Omisore, Yusuf, & Christopher, 2012). Maximization of the expected revenue of the investment or minimization of the risks is done through a balanced portfolio based on diversification of the investment instruments (Al-Saidi, 2012). Because they are subjected to a number of risks including market risk, credit risk, political risk and operational risk, risk management plays a major role in the determination of the investments for national asset funds (Dedu, & Nițescu, 2014).

A theoretical review of the investment strategies by the national asset funds reveals that every fund, at the investment stage, seeks to increase the revenues in accordance with the risk factor of the asset distribution and to maximize the long term economic revenues through asset diversification. In addition, national asset funds ensure investment diversity and prefer diversification of the assets to protect themselves against specific risks (Brown, 2009). Asset diversification applied by the asset funds also protects the fund-holder country against downward fluctuations that would take place in the value of one invested asset (Jory, Perry, & Hemphill, 2010).

Stewardship theory, on the other hand, suggests that when the administrators are given the opportunity to act on their own initiatives in the absence of a directive or supervision, they would assume a role of representing or protecting the movable assets under their management (Chioma, Uche, & Bassey, 2014). This theory suggests that steward spends efforts to ensure the organization achieves its goals and its behaviors follow a collective process. Steward acts to improve the welfare standards of the partners and in the meantime maximize its own utility function (Davis, Schoorman, & Donaldson, 1997). The citizens of the national asset fund countries view the asset fund management as a type of stewardship and have

confidence in their own government over the administration of the national resources by the fund (Chiomu, Uche, & Basse, 2014).

5. Literature Review

Despite that their history can be traced a century ago, national asset funds have not been adequately reviewed in the literature up to 2008 global financial crisis when they attracted a great attention in the financial and academic circles thanks to their investments and ability to alleviate the negative impacts of the crisis. It is possible to spot a number of works in the literature on the impacts of the national asset funds upon the national economies. Some of these works are as follows:

Dewenter, Han, & Malatesta (2010) analyze the change in the price of bonds after purchase by national asset funds by reviewing 47 sales in the period of 1996-2008 and 2002 purchases in the period of 1987-2008. The study finds that information by national asset funds on a specific bond on investment to the public increases the value of the bonds whereas information they reveal on the liquidation of the investments leads to decline in the price of the bonds of the firm. Another outcome of the study is that reaction of the bond prices to the national asset fund is a non-monotonic function of the size of the transaction. In their work, Candelon, Kerkour, & Lecourt (2011) empirically reviewed the macroeconomic determinants of the national asset fund investments. The study that focused on the analysis of the impact of such structural macroeconomic factors as governance and democracy investigates whether the asset funds in 73 countries considered these factors in time of investment in the period of 1989-2011. The study reveals that currency rate stability appears to be important for democracy and governance in European and North American countries whereas raw oil prices are strategic variables in other parts of the world.

In a study where the investment behaviors of Temasek Holding, founded as a national asset fund by the Singapore government, are reviewed, Heaney, Li, & Valencia (2011) employ t test of the average differences, logit and tobit analyses and take 150 public companies as basis of the analysis for the period of 2000-2004. It should be noted that the directors of Temasek Holding are not owners at the same time and made investments in relatively big (but small in number) companies.

A study by Bertoni, & Lugo (2013) analyzes the optimal portfolio distribution and detects the distinction between global and local optimality of the strategic asset distribution by reliance on the method of Gintchel and Scherer through three different statistical tests. The study covers the period of 2002-2005 and takes the State Retirement Fund of Norway (GPF), the largest asset fund in the world, as a case study. The GPF, in determining an asset distribution strategy, relies on risk diversification in connection with oil revenues. The empirical results confirm that in the determination of the portfolio distribution strategies of the GPF, static and dynamic deviation are in consistent with the theoretical predictions.

In their study, Johan, Knill, & Mauck (2013) analyze the investments by 19 national asset funds in 424 public and private companies for the period of 1991-2011 by probit model. The results reveal that like other corporate investors, national asset funds also pay greater attention to the public corporate investments rather than the private company investments. However, the economic impacts of this behavior remain limited. On the other hand, the study also reveals that if the policies to protect the investor in the target country or relations between the origin and host countries are poor, the national asset funds prefer private sector tools rather than public sector. In addition, in the investment plans made in other countries by the national asset funds, cultural differences play an important role. The investments by asset funds in the private companies are visibly different from the conventional corporate investors.

In their study, Megginson, You, & Han (2013) analyze the national determinants of the transnational investments made through 1590 bonds purchased by asset funds in 78 target countries in the period of 1985-2011. National asset

funds active in countries where capital markets are not fully developed make more transnational investments. On the other hand, it is concluded that the countries with advanced capital markets that protect the investors through proper policies are more successful in attracting national asset fund investment. Finally, the findings in the study support the idea that national asset funds assume a role of facilitating transnational corporate investments.

An empirical study by Chioma, Uche, & Bassey (2014) analyzes the impact of the Nigerian Asset Fund upon Nigerian economy in the period of 2011-2013 with reference to development and growth. 30 workers of the Nigerian National Asset Fund Authority were included as sampling in the study. The responses to the research questions were rearranged through average scores and standard errors. Parametric statistics in variance analysis (ANOVA) form, correlation coefficient and simple linear regression were used in the analysis. The analysis detects a statistical relationship between economic growth and national asset funds. But this relationship has not been considered positive because the Nigerian National Fund was relatively new and its contribution to the GDP was fairly limited to the hardships associated with the investments it made.

Fernandes (2014), in an empirical study relying on panel data analysis, analyzed the impacts of the national asset funds upon company values and performances. The study covers the period of 2002-2007 and reviews the investments of national asset funds in more than 8,000 firms in 58 countries. The study reveals that the investments by asset funds increased the values of the firms and contributed to their operational performances. The study further notes that the firms able to attract the national asset fund investments are able to have access to capitals and enter the foreign product markets.

A study by Boubakri, Cosset, & Grira (2016) comparatively analyze the determinants of the decisions by the national asset funds for investment in public investment companies, with reference to retirement funds. The study where 344 firms are identified as target countries by the national asset fund, along with 663 firms as control variable, for the period of 1991-2011 compares the funds with the retirement funds, concluding that the asset funds heavily invest in financial sector, natural resources, mining, transportation, telecommunication and public services. In addition, asset funds are more active than retirement funds in countries with poor legal and institutional environment but sustainable economic growth.

In their analysis of the factors determining the investment strategies of the national asset funds on a macro level, Ciarlone & Miceli (2016) question the type of action developed against the financial crises that had destructive impact upon national economy. The study, employing a three-level modeling method, reviews 1903 purchase deals concluded by 29 national asset funds for the period of 1995-2010. The study further finds that national asset funds will more likely invest in stable economies where there is visible economic development, advanced financial market and property rights are effectively protected. In addition, it is also concluded that the asset funds will have greater tendency of making investment again in countries where they made investment before.

6. Dataset

This study employs GDP as a dependent variable in the model. The USD-based GDP is used as indicator of economic growth; GDP data has been retrieved from the database of the World Bank. On the other hand, the fund sizes of the national asset funds of 6 countries (South Korea, Australia, New Zealand, Singapore, Azerbaijan and Chile) are taken as independent variable of the model. The reason these 6 countries are identified as independent variable is that the information on the size of these funds has been fully retrieved for a period of 2006-2015. Data recorded in terms of the national currency is used after conversion into the USD.

The study where the impact of the size of the national asset funds upon economic growth is analyzed employs control variables as well including property rights, public integrity, tax burden, judicial efficiency, public spending, fiscal

performance, labor, investment, commercial, financial and monetary freedom (economic freedom). Data on the control variable (economic freedom) of the countries reviewed in the model has been retrieved from Economic Freedom Index [Retrieved from]. Other control variables include real currency rates and export value index. The data on these control variables has been retrieved from the World Bank database. The variables in the model are in different units; for this reason, the logarithmic values of all dependent and independent variables have been used.

7. Methodology and empirical findings

This study analyzes the impact of the fund sizes of the national asset funds in 6 countries upon economic growth for a period of 2006-2015 by reliance on panel data econometrics. Panel data is defined as merger of the horizontal section observations of the units (nations, persons, corporations etc) in the period between the identified years. Horizontal section data covers a certain period only while providing insights on a number o units whereas time series offers information on more than one period for each unit (Yerdelen, 2013). Data in the study covers all times for every unit; this is why a balanced panel analysis has been used. The definitive statistics of the variables used in the econometric analysis is indicated in Table 2.

Table 2. Descriptive Statistics For Variables

Variable	Mean	Standart Deviation	Minimum	Maximum
GDPPPP	574351247827902	5.088	90879561542,8867	1740546808209,43
FONUSD	82120805528	84311353365	605000000	291313711400
OVERALLSCORE	76.18667	9.969657	53.2	89.4
LOFEXRATE	1.629494336	2.252638689	.7843475	9.547905158
LEXVAIND	2.489.270.944	1.590.153.285	19.767.851	8.931.862.464

Table 3 refers to the correltion coefficients between the variables used in the model. The presence of the high correlation coefficients among the independent variables in the model leads to presence of inconsistent predictors between parameters. The correlation matrix suggests that there is no high correlation coefficient between the independent variables in the model.

Table 3. Correlation Matrix For Variables

VARIABLES	LGDPPPP	LFONUSD	LOVERALLSCORE	LOFEXRATE	LEXVAIND
LGDPPPP	1.0000				
LFONUSD	0.6378	1.0000			
LOVERALLSCORE	0.2062	0.3266	1.0000		
LOFEXRATE	0.3260	0.2110	0.6207	1.0000	
LEXVAIND	0.0426	-0.0434	0.1149	0.2450	1.0000

The definitions of the variables used in the model are as follows:

LGDPPPP: The GDP calculated in terms of the power purchasing parity (calculated in USD)

LFONUSD: The size of the national asset funds in USD

LOVERALLSCORE: The economic freedom index involving property rights, public integrity, tax burden, judicial efficiency, public expenditures, fiscal governance, labor freedom, investment, commercial, financial and monetary freedoms

LOFEXRATE: Official currency rates

LEXVAIND: Expression of the current values of the exports based on FOB; 2000: 100 is taken as a basis.

The regression model in this study is defined as follows:

$$LGDPPPP_{it} = \alpha + \beta_1 LFONUSD_{it} + \beta_2 LOVERALLSCORE_{it} + \beta_3 LOFEXRATE_{it} + \beta_4 LEXVAIND_{it} + \varepsilon_{it}$$

In forming the regression model, the presence of the unit impact is tested. In the model where there is unit impact, one of the fixed or coincidental impact models is

used in the model. Hausman test statistics is used to make this decision. Because the p statistical value in the Hausman test is 0.9994, the H_0 hypothesis suggesting that hypothetical impact model should be used is rejected. Therefore, H_0 hypothesis has been accepted and the hypothetical impact model has been used. In addition, Breusch and Pagan tests have been used to determine whether classical model or coincidental impact model should be used. The Breusch Pagan test suggests that p statistical value is 0.0000, indicating that the classical model should be rejected and that the coincidental impact model should be used.

In order to obtain effective estimators in the regression model, the deviations from the hypothesis should be tested. These deviations are correlation between series, heteroskedasticity autocorrelation. To determine whether there is correlation between the series, Pesaran Cd test has been applied. P statistical value is determined as 0.0396, indicating that there is correlation between the series. Levene Brown and Forysthe test statistics are employed to determine heteroskedasticity; the test statistics of the test (w_0 , w_0 , w_{10}) are compared with 5.54 degree Snedecor F table; as a result, the H_0 hypothesis suggesting that the variance of the units are equal is rejected. Because P statistical values are less than 0.05, Heteroskedasticity is detected.

Whether or not there is autocorrelation in the coincidental impacts model is determined by used of Durbin Watson test of Bhargava, Franzini and Narendranathan and the local best unchangeable tests of Baltagi Wu. The test results refer to the presence of autocorrelation in the coincidental impact model.

Table 4 exhibits the results of the Hausman test indicating whether fixed or coincidental impact model should be used in the model.

Table 4. Random Effect Model Results from Estimations of Sovereign Wealth Funds Assets Size

LGDPPPP	MODEL
LFONUSD	0.0867
	0.0187*
LOVERALLSCORE	2.11
	0.464*
LOFEXRATE	-0.0034
	0.0039
LEXVAIND	0.0174
	0.0056*
CONSTANT	15.1
	1.76
Other tests on regression models	
Number of observations	60
Number of units	6
R ²	0.70
HAUSMAN TEST	0.9994
BREUSCH PAGAN	0.0000
WALD CHI2	920.247
WALD TEST Possibility	0.0000
DW	0.6163
BALTAGI WU	0.9934
LEVENE, W0	10.106
	(0.0000)
BROWN,W50	3.903
	(0.0043)
FORYSTHE W10	8.480
	(0.0000)
PESARAN TEST	0.0396

Note: * significant at %1 level

The coincidental impact model has been picked as a proper choice in the regression; in this regression, in order to obtain reliable estimators where there is correlation between units, autocorrelation and heteroskedasticity, necessary corrections involving nonrobust, robust and Ar1 process were performed. In the end, nonrobust (classic coincidental impact estimator), robust (used to form

resistant coincidental impact estimator where there is heteroskedasticity and autocorrelation) and AR (1) (situation where correlation occurs) have been obtained. The results of nonrobust, robust and AR (1) estimations indicate that the parameters of nonrobust and robust estimators are the same whereas their standard errors are different. Parameters of the AR (1) estimator are different from the parameters of nonrobust and robust estimator. In all three estimators, the statistical values of fixed parameters are significant. Wald test indicates that the model is significant for each model. In the regression model, a comparison between autocorrelation and interunit correlation, as well as heteroskedasticity problem reveals that rather than nonrobust and AR (1) estimator results, the use of robust estimator results will be more significant (Yerdelen, 2013).

The results of the analysis indicate that a 1 pct increase in the national asset funds leads to 0.086 pct of increase in the GDP. In addition, the economic freedom performance of the countries also has positive impact upon economic growth. The analysis demonstrates that 1 pct of improvement in economic freedoms leads to 2.11 pct of increase in the GDP. On the other hand, currency rate, one of the independent variables, is statistically insignificant in explaining the GDP. This result indicates that there is no relation between currency and economic growth. Finally, the export value index also provides positive contributions to economic growth. The analysis shows that 1 pct of increase in exports leads to 0.017 pct of improvement in the GDP.

8. Conclusion

National asset funds have become extremely important thanks to their current financial size. The relationship between these funds and some economic variables also becomes important because of this size. National asset funds are expected to ensure capital accumulation and create savings and sources. In addition, they also contribute to sustainable economic growth. Particularly in times of crisis, national asset funds are used to create source and sustain the current growth rates. For this reason, the impact of this huge source upon growth rate is considered an important issue. To detect this impact, 6 countries with 6 national asset funds are analyzed through a panel data analysis. In the model, GDP is dependent variable and the size of the national asset funds in South Korea, Australia, New Zealand, Singapore, Azerbaijan and Chile for the period of 2006-2015 is independent variable. The reason for selection of these 6 countries is that it was able to have access to the information on the size of the funds in these countries for the period of 2006-2015. In addition, economic freedom index, real currency rates and export indices are taken as control variables.

The results from the model suggest that the national asset funds have been successful in terms of contributing to the economic growth for the period of 2006-2015 in these countries. The results reveal that a 1 pct increase in the size of the national asset funds increases the GDP by 0.086 pct. What is important here is changes in the economic freedoms increase economic growth two times greater than the impact by the changes in the size of asset funds. Likewise, improvement in the export value index also positively contributes to the economic growth even though its scale is not similar to the impact by the size of the asset funds. In conclusion, the positive correlation between national asset fund size and economic growth makes these funds very significant instruments which should be designed in accordance with the characteristics of the home countries. In addition, it has been observed that efforts on the improvement of the economic freedom index will further contribute to the potential of the national asset funds in terms of their impact upon the economic growth.

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