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# **BUSINESS** **management**

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# THE GROWING ROLE OF SOVEREIGN WEALTH FUNDS IN MANAGING FOREIGN EXCHANGE ASSETS

Ivaylo Mihaylov<sup>1</sup>

**Abstract:** Nowadays, almost all countries possess foreign currency reserves that are necessary for making both expected and unforeseen transfers abroad, specifically payments for imported goods and settling foreign debt. Looking back, these reserves were held in precious metals, dollar deposits, and other savings and debt instruments in convertible currencies, and were managed by the central banks of the respective countries. However, in recent years, some countries, mainly developing ones, have accumulated reserves far above the necessary minimum that guarantees short-term payments and somewhat provides resources against unforeseen negative shocks. These surpluses are one of the reasons for the emergence of a new type of institutional investors in the form of sovereign wealth funds. Over the past twenty years, SWFs have experienced tremendous growth and therefore fall into the sights of fund managers and academic researchers. At the beginning of 2025, the assets they manage exceed 13.4 trillion dollars and are approaching the size of the foreign exchange reserves maintained by central banks, amounting to 16.8 trillion dollars.

The object of analysis is the structural dynamics of the assets of sovereign wealth funds, public pension funds and foreign exchange assets of central banks. For this purpose, we use a coefficient for the direction of structural dynamics and aggregated data for each unit of the structure for the period 2000-2024.

**Key words:** foreign exchange assets, sovereign wealth funds, central bank, pension funds.

**JEL:** E21; E22; F21.

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## 1. Accumulation of foreign reserves

Almost all countries hold foreign exchange reserves, which are needed to make both expected and unexpected transfers abroad, in particular payments for imports of goods and repayment of external debt. In retrospect, these reserves were held in gold, in short-term dollar deposits and in other savings and debt instruments in hard currency, and were managed by the central bank of the respective country. In recent years, however, a number of countries, mainly from the developing group, have accumulated reserves far in excess of the minimum necessary to guarantee payments in the short term and to some extent provide resources against unforeseen negative shocks (Alsweilem et al., 2015).

This trend, combined with the understanding that there are both direct and opportunity costs in asset accumulation, has led to a greater awareness of the need to move some of the low-yielding assets to SWFs, investment portfolios and other wealth management institutions, characterized by longer-term investment horizons, greater risk exposure and, accordingly, higher expected returns.

The analysis of state wealth accumulated from foreign exchange reserves requires a different approach to the part accumulated from the sale of natural resources, taking into account a number of fundamental differences between countries with large foreign exchange reserves and countries rich in raw materials.

- Reserve-rich countries do not face the same problems of stabilizing government revenues and securing additional savings as resource-based economies. As foreign exchange reserves do not serve as a major source of fiscal financing, their overall volumes are shielded from extreme volatility or severe drawdowns.

- The accumulation of foreign exchange reserves means that countries rich in reserves are faced not with the question of “how much should be saved”, but rather “how to invest the saved funds and, accordingly, what is most appropriate to spend them on”. Excess reserves usually accumulate in countries with a predominantly active trade balance in the balance of payments, which, in turn, is achieved by greater savings. Therefore, the decision to create a sovereign fund based on reserves does not mean a decision to save, but rather a change in the way in which the savings are used. As noted by D. Urban, these sovereign wealth funds help reduce the opportunity cost of reserve assets due to greater diversification of the reserve asset portfolio and allow countries to accumulate large capital

inflows without negative consequences such as exchange rate appreciation, price distortions, liquidity expansion, domestic asset bubbles, financial sector imbalances and inflation (Urban, 2011).

Despite these differences, there are many commonalities in the management of both forms of sovereign wealth. These similarities relate to the objectives and motivations behind the creation of various sovereign wealth pools and portfolios, the investment strategies adopted to achieve these objectives, and the institutional arrangements necessary for their effective management.

### **2. Government structures managing foreign exchange assets**

State-owned investment entities play a crucial role in managing public resources, as well as in supporting economic development and national economic goals. These entities include: the central bank (CB), public pension funds (PPFs), and sovereign wealth funds.

A central bank is a legally independent institution that controls the money supply and/or interest rates in order to conduct the country's monetary policy. The main objectives pursued by modern central banks are the following: maintaining price stability; supporting non-inflationary economic growth, maintaining low unemployment, and pursuing a policy of stabilizing the national currency. One of the key functions of central banks is the management of the country's foreign exchange reserves.

Public pension funds are a special type of pension fund that is managed by the state or state institutions and is part of the social security system. Their main purpose is to provide pensions to citizens by collecting contributions in advance and investing the accumulated funds in order to obtain a return (Bloomberg, 2025).

The main activities of the PPFs are:

- collection of contributions - contributions are collected from working citizens and their employers;
- investment of funds - funds are invested in various financial instruments to ensure stability and profitability (Megginson & Gao, 2020).;
- payment of pensions - according to local legislation, upon reaching retirement age, the fund begins to pay pensions to its members.

These funds play a key role in the social security of citizens and provide security and predictability of income after retirement.

Sovereign wealth funds are government investment funds that manage national assets with the aim of long-term capital appreciation. They are typically financed by budget surpluses, revenues from the sale of natural resources, or foreign exchange reserves. Over the past twenty years, SWFs have experienced tremendous growth and therefore fall into the sights of fund managers and academic researchers. At the beginning of 2025, the assets they managed exceeded \$13.4 trillion, approaching the size of the \$16.8 trillion in foreign exchange reserves maintained by central banks (Balding, 2012).

The main role of the SWFs is:

- *investment* - SWFs invest in various asset classes such as stocks, bonds, real estate and infrastructure projects to provide stable returns and diversification of national assets;
- *stabilization of the economy* - they can be used to stabilize the economy in periods of financial crises or downturns by providing liquidity and support to national markets;
- *support for strategic projects* - SWFs often finance long-term infrastructure and strategic projects that are of key importance for the country's economic development;
- *international influence* - through their investments, sovereign funds can increase the state's international influence and create partnerships with other countries and corporations.

Based on the goals they set for themselves and the tools they use to achieve them, there are opinions in the specialized literature that SWFs can be defined as government-controlled investments, which gives some authors reason to speak of a new model of state capitalism. A recent article notes that the lack of transparency and accountability of sovereign wealth funds varies, and state ownership raises suspicions, unfair commercial advantages, opportunities for corruption, and threats to national security, thus challenging the liberal economic order (Kemme, 2026). Another piece of evidence in this direction is the in-depth study by three authors, who find that Gulf Cooperation Council (GCC) SFs do not take into account the financial characteristics of target firms when acquiring large cross-border stakes, but rather the characteristics of the country (European Union countries and/or countries with a high level of shareholder protection), suggesting that their motives may go beyond pure profit maximization (Amar et al., 2022).

In recent years, there has been a growing interest in sovereign wealth funds and the role they play in managing government surpluses. Their rise

as a global investor is evident not only in the growing size of their portfolios (see Table 1), but also in the increasing number of newly created funds. It is believed that this growth is due to the fact that governments of a number of countries around the world appreciate the merits of sovereign funds in managing reserves (Alsweilem et al., 2015). The number of SWFs established worldwide per decade peaked during the decade from 2010 to 2019. During this ten-year period, 60 new sovereign funds were created, and from 2010 to 2022 the number increased to 73. This is 23 more investment funds compared to the previous decade and a higher number than the total number of all newly created sovereign investment funds before the year 2000. Asia and the Middle East and North Africa are the largest regions when it comes to assets under management of SWFs (Statista, 2025).

There is empirical evidence that the probability of creating a fund is maximized when a country's GDP reaches \$700 billion (Altuve, 2024). Another interesting finding is that autocratic regimes are more likely to create a sovereign wealth fund than democratic ones. Other studies find that volatility in commodity prices contributes to the probability of creating a fund, which is consistent with the idea that precautionary saving helps smooth the effects of stochastic shocks to commodity prices (James et. al., 2022).

Based on what has been said so far, it can be concluded that all three state structures - the Central Bank, the PPFs and the SWFs - have their place and play key roles in the economy. These institutions are essential for maintaining economic stability, growth and social security.

### **3. Types of risk associated with the activities of sovereign wealth funds**

According to the Generally Accepted Principles and Practices (GAPP) for Sovereign Wealth Funds and Risk Management, every sovereign wealth fund must have a framework that identifies, assesses and manages the risks of its operations. The risk management framework performs the following key functions:

- *Clarifies risk appetite.* Formulates the quantitative and qualitative aspects of the fund's risk appetite in line with its mandate, size, investment policy and structure.

- *Identifies and measures risks.* Identifies and assesses potential risks that may hinder the fund's success.

- *Establishes a risk management structure* and a set of procedures through which potential risks can be mitigated and monitored.

Like sovereign investment funds, sovereign wealth funds are exposed to a wide range of risks that can be grouped into two categories (Divakaran et al., 2022):

1. *Investment risks.* These risks affect both individual investments and the fund's portfolio. Consequently, they must be offset by a commensurate expected return for the risk taken. The group of investment risks includes:

- *Market risk*, also known as systematic risk, the sources of which are the dynamics of interest rates, changes in the prices of commodities and raw materials, exchange rate volatility, geopolitical events, natural disasters, recession, etc. The occurrence of these risks may lead to unrealized or realized capital losses for the fund's portfolio. A characteristic feature of market risk is that it cannot be eliminated through diversification.

- *Credit risk* - the possibility of financial loss arising from a borrower's inability to repay a debt or fulfill contractual obligations on time.

- *Liquidity risk* - the risk that the company will sell assets below their market value in order to immediately meet obligations.

- *Third-party risk* - the hazards and complications arising from joint ventures or strategic partnerships with entities that have conflicting financial and strategic interests.

2. *Non-investment risks.* This category includes operational, regulatory and reputational risks that affect the overall operation of sovereign wealth funds. Unlike financial risks, non-investment risks affect the overall operations of sovereign wealth funds and cannot be offset by higher investment returns. Rather, these risks must be addressed through mitigating measures.

- *Operational risk.* Operational risk encompasses the various risks arising from a fund's traditional business activities. According to one classification frequently found in specialized literature, operational risks are divided into two primary groups: discretionary (which depend on the organization's internal actions and decisions) and systemic (which depend on factors external to the organization). Discretionary risks include risks arising from the actions of employees and from safe working conditions, technological risks, as well as internal fraud (Lopez, 2023).

- The scope of systemic risks includes: external fraud, risks related to customers, products and business practices (Gerunov, 2022).

- *Regulatory risks* – regulatory risks arise from changes in the laws and regulations governing the work of the SWF, or changes in the implementation of such laws and regulations.

- *Reputational risk* - this risk is associated with the possibility that negative publicity about the conduct of the SWF, whether real or perceived, could negatively impact the return on investment, lead to costly litigation or loss of counterparties, or damage the international reputation of the home government.

- *Political risk* - this risk arises from both global and domestic political events. It may result from geopolitical changes that directly or indirectly affect the SWF's activities as a strategic or sovereign investor, or from shifting domestic politics that threaten to undermine the SWF's legitimacy or, in extreme cases, alter its strategic focus.

It should be noted that in the world of institutional investing, geopolitical risk has emerged as a pressing issue. Many asset owners admit that they are not sufficiently prepared, do not have the appropriate analytical frameworks and relevant expertise to deal with this risk. The rivalry between the great powers of the USA, China and Russia, as well as among regional players, is not something that investors are familiar with in detail. Geopolitical risk has become much more comprehensive and systemic, as it has moved from the periphery to the very core of the global economy, especially after the election of Donald Trump as US president and the vote to leave the EU by the UK in 2016. In addition, geopolitical risks arise not only as a result of how and where institutions invest, but also from the nature of investors. For example, Danish PPFs and Chinese SWFs investing in US stocks will face different risks and vulnerabilities (Rozanov, 2021).

A sovereign wealth fund typically captures the specific risks to which it is susceptible through a customized methodology that can systematically monitor, mitigate, and report risks at the investment and portfolio levels. Such a methodology identifies the largest risks and where they originate, creates a scoring system that integrates both quantifiable and non-quantifiable risks, and sets acceptable levels of risk as a benchmark. For example, the Nigeria Sovereign Investment Authority has developed a tool for pre-assessment of risks for all infrastructure projects. The tool takes into account several qualitative and quantitative factors. Those considered to be medium or high risk are included in the investment summary for approval along with proposed mitigating measures. The system can then be used to monitor and assess the level of risk of a transaction before the investment

is made (ex ante) and of a company's portfolio after the funds have been invested (ex post).

The highest decision-making body of the SWFs, usually the board of directors, is responsible for articulating the fund's risk appetite, approving the risk management framework, and overseeing the management and monitoring of risks. The risk mitigation policy is integrated into the overall governance framework of the SWF, often characterised by a "three-tiered defence" approach, where each level of defence is tasked with clarifying the significance of investment or operational decisions, according to their impact on risk and, consequently, on the SWF. The three levels of defence are as follows:

- *Investment team.* The first line of defense is primarily anchored by the investment team, which performs due diligence<sup>2</sup> in accordance with the risk profile of the fund. The investment committee of the sovereign fund then provides oversight, assessing investment risks based on relevant analyses and approving the final decision.

- *Risk management team.* The second line of defense typically focuses on the SWFs risk management team. Risk management sets clear risk guidelines and reporting procedures based on the fund's investment policy and strategy. The management team typically assesses risk at the investment level, engaging with the investment team in the due diligence process and providing feedback to the SWF's investment committee accordingly. The risk manager's influence on investment approval varies depending on the fund's objectives. In many cases, the SWF manager does not formally have veto power over investment decisions, but may challenge the investment thesis formulated by the investment team.

- *Internal audit.* The third line of defense in a sovereign wealth fund consists of internal audit and compliance groups that ensure compliance with the laws, regulations, and policies under which the SWF is expected to operate, including those related to risk exposure. Such groups also provide independent assessments to the SWFs board and relevant board subcommittees whose primary responsibility is to control risk and audit performance.

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<sup>2</sup> Due diligence translates to reliable verification. According to the Cambridge Dictionary, due diligence is: "a detailed examination of a company carried out before entering into a business agreement with it". In practice, it is a process of collecting, verifying and systematically analyzing legal and financial-economic information (e. g. information about the company's assets, liabilities, concluded contracts, benefits and potential problems) to enable the principal to make an informed decision. Due diligence can be prepared at the request of the buyer or the seller, but ultimately the information is useful to both parties. The analysis is carried out by audit companies, analytical firms, etc.

### 4. Sovereign wealth and pension funds

Public pension funds are not of particular academic research interest unless they are considered as part of an overall assessment of institutional investors' corporate governance. To a significant extent, these institutions have more similarities than differences with sovereign wealth funds. Both are large, internationally active investment vehicles operating with relatively small staffs. They invest in pursuit of commercial rather than social returns (Yu-Wei Hu & Yermo, 2008).

As previously established, Sovereign Wealth Funds (SWFs) serve a number of potential purposes. They can be difficult to categorize by policy, as many funds pursue more than one of these commonly recognized goals. The primary objectives that shape the philosophy of most funds include: diversifying assets to generate better investment returns; supporting pension systems; providing for future generations once natural resources are exhausted; managing price stabilization schemes; promoting industrialization; and supporting strategic and political goals.

On the other hand, other pools of funds for financing pension payments also fall within the scope of governments. There are two types of funds for this purpose: some are created and owned directly by the government (known as state pension reserve funds), and the others belong to the social security system. The similarities between them are that both types manage massive assets, are autonomous, and are directly or indirectly managed by public sector institutions. Like sovereign wealth funds, those belonging to the social security system are increasingly investing abroad and shifting to alternative assets. Consequently, the financial stability concerns surrounding both sources of pension funds are similar.

However, the objectives of these funds differ somewhat. First, social security funds serve as a means of long-term financing of state-guaranteed pensions (so-called state social security) and other insurance-related benefits, while SWFs are typically established to protect the local economy from fluctuations in commodity prices, as well as to diversify foreign currency holdings, usually invested in higher-yielding assets. The former manage assets to meet clearly defined commitments and obligations of the state, while sovereign wealth funds traditionally have broader objectives and are rarely tasked with meeting specific government expenditures. For this reason, the investment horizon of SWFs tends to be longer and more growth-oriented than that of social funds.

Secondly, in many countries, social funds are normatively constrained from investing their resources in risky ways, which is why they are forced to invest mainly in government and municipal securities on local markets. For emerging market economies, where institutional investors and capital markets are not sufficiently developed, the role of social systems in providing resources and supporting the financial sector is of key importance. In comparison, the funds of the SWFs are invested mainly in foreign assets.

Third, as previously noted, the two fund pools rely on distinct revenue streams. Sovereign wealth funds are largely financed by export-driven foreign exchange earnings and/or central bank reserve transfers, whereas government welfare systems accrue capital through social security contributions and direct fiscal transfers from the central budget.

## **5. Analysis of the structural dynamics of the assets of the SWFs, PPF and the Central bank**

Generally speaking, a statistical structure represents the internal composition of a statistical population, expressed through the relative proportions of its constituent parts. The analysis of these structures is a distinct branch within the general theory of statistics, with one of its primary goals being the study of how structures evolve over time.

In this section, we examine the evolution of a three-part statistical structure from 2000 to 2024 from an alternative perspective. Rather than focusing on the magnitude of structural shifts—the standard approach in structural analysis—we emphasize the direction of these changes, or, in other words, the direction of structural dynamics.

To calculate the directionality of structural dynamics, we refer to Encho Zhekov's publication "*Continuity of Changes in Statistical Structures*" and the coefficient proposed by him (Zhekov, 2007). The author analyzes the coefficient of directionality of structural dynamics proposed by Garabed Minasyan, which considers the idea of representing structures as vectors, and measuring the magnitude of structural changes by the angle at which these vectors are rotated. Minasyan further develops the idea of Vladimir Kossov and proposes another application of the angle between the two vectors, introducing the so-called coefficient of directionality of structural dynamics (CDS). It has the following form:

$$CDSD = \frac{\alpha_{02}}{\alpha_{01} + \alpha_{12}} \quad (1)$$

where  $\alpha_{02}$ ,  $\alpha_{01}$  and  $\alpha_{12}$  are the angles by which the changes in the structure are measured, respectively at time  $t_1$  relative to time  $t_0$ , at time  $t_2$  relative to coin  $t_1$  and at time  $t_2$  relative to  $t_0$ . Other measures of structural changes are used in theory and practice, but the function of the proposed coefficient is different. In theory and practice, other measures of structural change are also used, but the function of the proposed coefficient is different. Generally speaking, the CDSD measures how the structure evolves across two consecutive sub-periods. Specifically, it indicates whether structural changes in the second sub-period maintained the direction of the first, or if they shifted to an opposing trajectory. In other words, the coefficient measures the consistency of the direction of structural changes over a given period compared to the preceding one.

Encho Zhekov (2007) believes that the idea of measuring the continuity of structural changes deserves more attention. The author makes a critical reading of coefficients proposed by other authors and concludes that the lack of interest in this aspect of studying the changes in statistical structures is probably due to the fact that the coefficients in question are applicable only in cases where the structures are considered as vectors. On this basis E. Zhekov makes an attempt to prove that the development of a universal indicator for measuring the direction of structural changes, which would be derived directly from the values of the relative shares of the parts of the structure, would not only have important theoretical and practical application, but would also confirm the study of the continuity of changes in statistical structures as part of the overall analysis of structural changes.

The author develops and proposes a universal coefficient measuring the directionality (continuity) of structural changes over two sub-periods of a period. This coefficient may have other applications. For example, it can be used not only in the analysis of dynamic structures (structural changes), but also in the analysis of static structures (structural differences and structural unevenness).

After appropriate mathematical transformations, the directionality coefficient of structural dynamics, normalized in the interval  $[-1,1]$ , has the following form:

$$K^{**} = \frac{\sum_{i=1}^k (V_{i0} - V_{i1}) (V_{i1} - V_{i2})}{\sqrt{\sum_{i=1}^k (V_{i0} - V_{i1})^2 \sum_{i=1}^k (V_{i1} - V_{i2})^2}} \quad (2)$$

where:

$V_{i0}$ ,  $V_{i1}$  and  $V_{i2}$  are the values of the relative shares of the structure at three consecutive moments.

In this form, the coefficient of continuity of changes in statistical structures (direction of structural dynamics) can be calculated directly from the relative shares of the parts of the structures and can be used not only when the structures are represented as vectors. In practice, by measuring the direction of structural dynamics over two sub-periods, the coefficient shows the extent to which the changes in the second sub-period depend on those in the first. When  $K^{**} = 1$  and the directionality is maximally positive, it can be argued that there is a complete positive linear dependence or continuity between the changes in the relative shares. When  $K^{**} = -1$  and the directionality is maximally negative, it can be argued that there is a complete negative linear dependence. When  $K^{**} = 0$  and there is no directionality of the structural dynamics, this can be interpreted as the absence of a linear dependence or continuity between the relative shares.

Using formula 2, we will calculate and analyze the structural dynamics of the assets of sovereign wealth funds, public pension funds, and central bank foreign exchange assets. For this purpose, we will use aggregated data for each unit of the structure for the period 2000-2024. The information is for the size of assets on a global scale, not for a separate region or country (Table 1).

**Table 1**  
*Government investors (in trillions of US dollars)*

|             | CB   | SWFs | PPF  |             | CB   | SWFs | PPF  |
|-------------|------|------|------|-------------|------|------|------|
| <b>2000</b> | 6.4  | 1.2  | 4.6  | <b>2013</b> | 13.2 | 6.0  | 136  |
| <b>2001</b> | 6.6  | 1.2  | 4.7  | <b>2014</b> | 13.3 | 6.4  | 14.5 |
| <b>2002</b> | 6.8  | 1.2  | 5.2  | <b>2015</b> | 12.7 | 6.4  | 14.5 |
| <b>2003</b> | 7.0  | 1.3  | 5.8  | <b>2016</b> | 12.7 | 6.6  | 15.3 |
| <b>2004</b> | 7.2  | 1.6  | 6.7  | <b>2017</b> | 13.4 | 7.4  | 17.4 |
| <b>2005</b> | 7.5  | 1.9  | 7.7  | <b>2018</b> | 13.4 | 7.4  | 17.9 |
| <b>2006</b> | 7.7  | 2.5  | 8.5  | <b>2019</b> | 14.0 | 8.4  | 19.7 |
| <b>2007</b> | 7.9  | 3.1  | 9.4  | <b>2020</b> | 15.1 | 9.3  | 21.3 |
| <b>2008</b> | 8.2  | 3.5  | 9.7  | <b>2021</b> | 16.2 | 10.9 | 23.8 |
| <b>2009</b> | 9.5  | 3.7  | 9.8  | <b>2022</b> | 15.5 | 10.5 | 22.3 |
| <b>2010</b> | 10.9 | 4.3  | 10.9 | <b>2023</b> | 15.4 | 11.8 | 23.8 |
| <b>2011</b> | 12.1 | 4.8  | 11.8 | <b>2024</b> | 15.5 | 11.9 | 23.8 |
| <b>2012</b> | 12.8 | 5.4  | 12.6 | -           | -    | -    | -    |

Source: Global SWF, 2024.

Table 2 below presents the results. Based on the data we have, the relative shares of each unit of the structure in relation to the total amount have been calculated, and the last column presents the values of the coefficient for the directionality of structural dynamics. The first conclusion that can be drawn is that in almost all two-year periods the values of the coefficient are positive and in the majority they are significantly high (values above 0.7 are marked in gray). This shows that during the entire period from 2001 to 2020, with minor exceptions (2007 - 2009 and 2010-2012), the structure has changed approximately in one direction. Only in the first period and in the two-year periods after 2021 are the coefficients negative. Then the structure changes in a less unidirectional way.

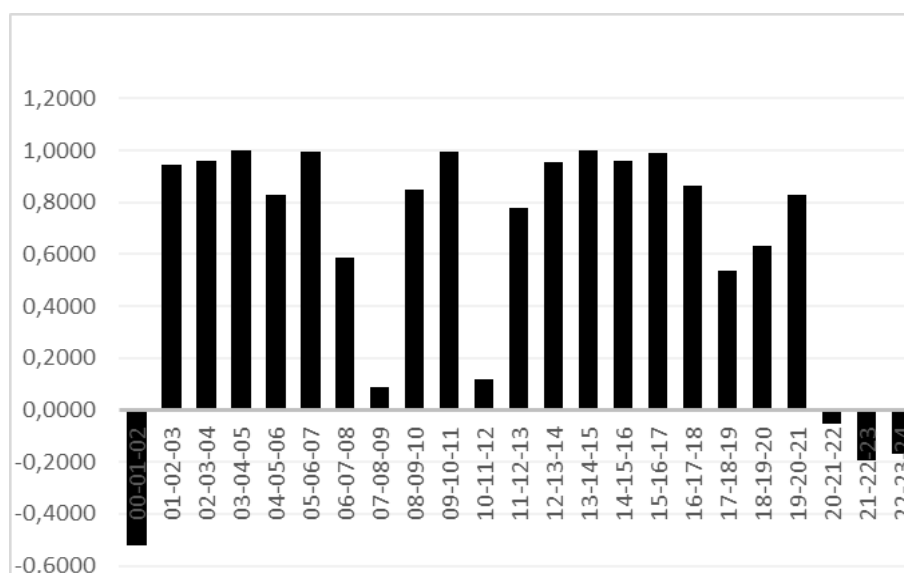
*Table 2*  
*Coefficients for the direction of structural dynamics*

| Year | CB   | CB (%) | SWF  | SWF (%) | PPF  | PPF (%) | Total | Period   | CDSD           |
|------|------|--------|------|---------|------|---------|-------|----------|----------------|
| 2000 | 6.4  | 52,5%  | 1.2  | 9,8%    | 4.6  | 37.7%   | 12.2  |          |                |
| 2001 | 6.6  | 52,8%  | 1.2  | 9,6%    | 4.7  | 37.6%   | 12.5  |          |                |
| 2002 | 6.8  | 51,5%  | 1.2  | 9,1%    | 5.2  | 39.4%   | 13.2  | 00-01-02 | -0.5225        |
| 2003 | 7.0  | 49,6%  | 1.3  | 9,2%    | 5.8  | 41.1%   | 14.1  | 01-02-03 | <b>0.9425</b>  |
| 2004 | 7.2  | 46,5%  | 1.6  | 10,3%   | 6.7  | 43.2%   | 15.5  | 02-03-04 | <b>0.9597</b>  |
| 2005 | 7.5  | 43,9%  | 1.9  | 11,1%   | 7.7  | 45.0%   | 17.1  | 03-04-05 | <b>0.9990</b>  |
| 2006 | 7.7  | 41,2%  | 2.5  | 13,4%   | 8.5  | 45.5%   | 18.7  | 04-05-06 | <b>0.8265</b>  |
| 2007 | 7.9  | 38,7%  | 3.1  | 15,2%   | 9.4  | 46.1%   | 20.4  | 05-06-07 | <b>0.9951</b>  |
| 2008 | 8.2  | 38,3%  | 3.5  | 16,4%   | 9.7  | 45.3%   | 21.4  | 06-07-08 | <b>0.5894</b>  |
| 2009 | 9.5  | 41,3%  | 3.7  | 16,1%   | 9.8  | 42.6%   | 23.0  | 07-08-09 | <b>0.0882</b>  |
| 2010 | 10.9 | 41,8%  | 4.3  | 16,5%   | 10.9 | 41.8%   | 26.1  | 08-09-10 | <b>0.8488</b>  |
| 2011 | 12.1 | 42,2%  | 4.8  | 16,7%   | 11.8 | 41.1%   | 28.7  | 09-10-11 | <b>0.9965</b>  |
| 2012 | 12.8 | 41,6%  | 5.4  | 17,5%   | 12.6 | 40.9%   | 30.8  | 10-11-12 | <b>0.1162</b>  |
| 2013 | 13.2 | 40,2%  | 6.0  | 18,3%   | 13.6 | 41.5%   | 32.8  | 11-12-13 | <b>0.7768</b>  |
| 2014 | 13.3 | 38,9%  | 6.4  | 18,7%   | 14.5 | 42.4%   | 34.2  | 12-13-14 | <b>0.9537</b>  |
| 2015 | 12.7 | 37,8%  | 6.4  | 19,0%   | 14.5 | 43.2%   | 33.6  | 13-14-15 | <b>1.0000</b>  |
| 2016 | 12.7 | 36,7%  | 6.6  | 19,1%   | 15.3 | 44.2%   | 34.6  | 14-15-16 | <b>0.9607</b>  |
| 2017 | 13.4 | 35,1%  | 7.4  | 19,4%   | 17.4 | 45.5%   | 38.2  | 15-16-17 | <b>0.9888</b>  |
| 2018 | 13.4 | 34,6%  | 7.4  | 19,1%   | 17.9 | 46.3%   | 38.7  | 16-17-18 | <b>0.8625</b>  |
| 2019 | 14.0 | 33,3%  | 8.4  | 20,0%   | 19.7 | 46.8%   | 42.1  | 17-18-19 | <b>0.5369</b>  |
| 2020 | 15.1 | 33,0%  | 9.3  | 20,4%   | 21.3 | 46.6%   | 45.7  | 18-19-20 | <b>0.6330</b>  |
| 2021 | 16.2 | 31,8%  | 10.9 | 21,4%   | 23.8 | 46.8%   | 50.9  | 19-20-21 | <b>0.8269</b>  |
| 2022 | 15.5 | 32,1%  | 10.5 | 21,7%   | 22.3 | 46.2%   | 48.3  | 20-21-22 | <b>-0.0541</b> |
| 2023 | 15.4 | 30,2%  | 11.8 | 23,1%   | 23.8 | 46.7%   | 51.0  | 21-22-23 | <b>-0.1950</b> |
| 2024 | 15.5 | 30,3%  | 11.9 | 23,2%   | 23.8 | 46.5%   | 51.2  | 22-23-24 | <b>-0.1677</b> |

Source: Global SWF, 2024 and own calculations.

The decline in the ratio at the beginning of the period under review coincides with the dot-com bubble of the early 21st century, which was associated with the rapid increase in the value of shares of Internet companies. During this period, many new internet-related companies emerged and increased their market value. Investors directed significant funds into companies in this sector, in most cases without paying attention to basic financial indicators such as P/S (price-earnings). Thus, a phase of euphoria and confidence in new technologies was entered, where the market demonstrated optimism and confidence that Internet companies would generate large profits in the future. Unfortunately, however, in 2001 the bubble burst, which led to significant losses – some of the companies went bankrupt, while others lost a significant part of their market value. This explains the relatively modest growth in the foreign exchange assets of central banks and public pension funds and the lack of growth in the assets of the SWFs.

The coefficient also captures the problems surrounding the Global Financial Crisis (2007-2008), as well as the period of post-crisis recovery of economies from the consequences of the recession. Although the coefficient is not negative, the graph shows that it has marked a sharp decline and is established at levels below 6 and close to 0. The same decline is observed in the years of COVID-19.



*Figure 1. Dynamics of the coefficient of directionality of structural dynamics for the period 2000–2024*

After 2021, the coefficients turned negative but remained closer to zero in absolute value. This indicates a non-unidirectional structural shift rather than a strictly negative trend. These variations can be attributed to the post-2020 economic slowdown, which was driven by:

- *The COVID-19 pandemic.* The pandemic led to significant restrictions and closures that reduced economic activity in many sectors. This included reduced consumption, disruptions in production chains, and a decline in international trade.

- *Global economic uncertainty.* The pandemic increased uncertainty in global markets, which led to reduced investment and a slowdown in economic recovery. In the context of our research, this is associated with large government support expenditures and loss of foreign exchange reserves.

- *Inflation and high energy prices.* The recovery from the pandemic was accompanied by high inflation and increased energy prices, which further burdened economies and reduced the purchasing power of consumers. Geopolitical tensions, conflicts and the war in Ukraine added additional value to the weight of this factor. High energy prices proved favorable for hydrocarbon-exporting countries and provided additional income to the portfolios of the SWFs.

The analysis of changes in the observed structure, using the coefficient of directionality of structural dynamics, is useful in itself, because it shows the degree of consistency of these changes during the various one-year sub-periods after 2000. In other words, the trends that are noticeable from the data in the table, gain a clearer numerical expression. The results of this analysis are even more interesting, however, if we take into account that during all these sub-periods, the changes in the structure are very insignificant. For example, the three most frequently used coefficients for measuring the magnitude of structural changes - the coefficient of absolute structural changes, the coefficient of relative structural changes and the integral coefficient of structural changes of Kiril Gatev, take values below 0.1 (with a maximum value of 1.0) for all periods, without exception, which unambiguously shows that the structure has changed insignificantly. But although insignificantly, it has changed in one direction almost all the time.

## Conclusion

Compared to other state structures managing foreign exchange assets, SWFs are relatively young institutions, but as the analysis shows, their role in the management of foreign exchange assets is growing. The catalyst for their development turned out to be the World Financial Crisis of 2007-2008 and the Santiago Principles adopted at the same time.

In the years since the COVID-19 pandemic, sovereign wealth funds (SWFs) have proven to be not just well-capitalized structures, but also catalysts for change and effective hedging tools capable of amplifying or counteracting trends in financial markets. Their investment strategies account for shifts in the global economy, geopolitical uncertainty, demographic changes, and environmental standards, among other evolving global factors. While making precise predictions about the future of SWFs is difficult, the industry will undoubtedly continue to expand and capture a larger market share, cementing SWFs as an unavoidable force in global financial markets.

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