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How Would Investing in Equities Have Affected the Social Security Investment Fund in an Emerging Market? Can Governance Help?

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Abstract:

Purpose: *This paper explores the impact of the Social Security Investment Fund's (SSIF) portfolio diversification into private securities in Jordan. However, the policy shift exposes the program to higher financial risk.*
Design/methodology/approach: *It extends to examine whether corporate governance can be related to better performance and can be used as an additional selection criterion for sound investment decisions. SSIF is the largest fund in Jordan, with a market value of 14.5 billion dollars as of 2019. SSIF believes that investing a portion of its assets in equities would likely reduce the need for higher payroll taxes and strengthen the program's long-term financial outlook.*
Findings: *Investment and long-term asset values can move in opposite directions. Constructing the first Corporate Governance Index (CGI) for Jordan's firms, we document a negative relationship between CGI and portfolio performance. Asset selection increases portfolio return while at the same time, lower the governance level of the selected stock portfolio. This result is in line with prior empirical research, which also demonstrated that the lower the governance standards, the stronger the correlation between governance and firm value and performance.*
Practical inplementation: *Investing a portion of trust fund assets in equities would likely reduce the need for higher payroll taxes and strengthen the program's long-term financial outlook.*
Originality value: *Social security trust fund's policy shift towards more equity investment reduces the aggregate capital stock and exposes future generations to more uncertainty.*

Keywords: *Diversification, long-term financial outlook, financial risk, corporate governance.*

JEL codes: *H55, G11, G34.*

Paper Type: *Research article.*

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1. Introduction

There was always a belief that social security must shift its portfolio allocation inside the Social Security Investment Unit (SSIU[3]) in Jordan toward purchasing risky equity to comprise a significant part of a comprehensive asset allocation package. This reallocation could strengthen its finances and improve intergenerational risk-sharing.

Adopting this strategy is to shift would help lessen some of the social security's financial problems, give all retirees a 'fairer' rate of return, and help the economy by increasing the aggregate size of the capital stock. The goal is to increase the fund return by taking advantage of higher returns earned by equities and reducing the increases in payroll taxes or the calibrating benefits of returning the Social Security system to financial viability.

Unfortunately, results were discouraging, and the increased size of investments in the stock market caused a significant loss of value; much of the forwarded cash came in vain. Finally, social security corporations ended up raising payroll taxes and lengthening the working lifetime.

Things did not go as planned, and the equity investments exposed the program to higher financial risk and potentially higher political risk. The intensive investment in equity has caused a total loss of about 2.6 billion dollars out of the 5.18 billion dollars between 2005 and 2019, with no single strategic tool to stop this more than fifty percent loss of value. Shifting funds to the trust was not wise; social security did not set long-run performance objectives without real equity premium projection.

Pestieau and Possen (2000) show that switching the social security trust fund towards a more significant investment in equities in the United States would have a limited effect on achieving these goals. The researchers show that rebalancing the portfolio allocation of the social security trust fund in favor of more equity investment, all other things being equal, reduces the aggregate capital stock and the average consumption level of all individuals, except the poor retirees. The latter receive an increase but at the cost of a substantial increase in uncertainty.

Diamond and Giannakopoulos (2003) explore the general equilibrium impact of social security portfolio diversification into securities through trust funds or private accounts. They mainly find that limited diversification weakly increases the interest rate, reduces the expected return on short-term investment (and the equity premium), increases risky investment on behalf of a safe investment, and decreases aggregate investments and asset values in the long.

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[3] *SSIF, previously Social Security Investment Unit (SSIU), called its equity portfolio the strategic portfolio.*

Weller (2000) discusses the economic risk involved in public and private equity investments as a funding solution for Social Security in the United States. Weller uses stochastic simulations.[4] In combination with different assumptions about the rates of return on bonds and stocks to quantify the risks involved in equity investment. For public equity investments, the financial market risk remains significant for at least forty years.

For individual accounts, Weller finds that the likelihood of performing poorly with Social Security or of plunging into poverty in retirement is generally high, yet varies with income level, gender, family status, and employment history. In general, women, married workers with dependent spouses, or workers with incomplete work histories do worse than men, single workers, or workers with complete work histories than the current system or the poverty line.

Elder and Holland (2016) study the effect of proposals to shift a portion of the U.S. Social Security Trust Fund investments to the equities market. They conclude that investing in equities or decreasing the Social Security Trust Fund's size will cause interest rates to increase. Shifting the investment mix from bonds to equities may negatively affect income transfers from American taxpayers to foreign bondholders.

Radisich (2000) re-evaluated the common perceptions that investing the trust fund into the stock market would save the Social Security system by capturing the stock's equity premium over bonds. Radisich reports a timing effect that makes the equity premium difficult for social security to capture. The stock market's pro-cyclicality and Social Security's cash flows imply that stock prices are highest when the Social Security system has the most money to invest. Similarly, when Social Security has the least to invest, stock prices are at their lowest. His results support that stock investment benefits for Social Security are overestimated, and no such timing effect exists for bonds.

Sabelhaus (2005) questioned the prediction of longer-run equity premium in stock returns and raised a concern about shifting Social Security investments toward the stock market. The correlation between equity returns and market fundamental are weak at annual frequencies. This fact has led researchers to conclude that a random return (fixed mean and variance) model is the preferred specification for simulating equity returns' future path. When the Monte Carlo simulation of Social Security reform is considered, future equity premium projections are questioned.

Diamond (2000) (social security bulletin) argues that projections have over-vaulted stock market future return at 7.0 percent return and a "correctly valued" hypothesis implies an implausibly small equity premium. He suggests using a better approach that would assume lower returns over the next decade and 7.0 percent.

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[4]*Based on the economic assumptions of the 1998 Trust Report of Old Age and Survivors Insurance and Disability Insurance.*

Dotsey (1997) addresses the economic merits of investing a portion of the current trust fund in the higher return stock market. He suggests that the ownership of the capital stock has very few consequences for the government's budget. The economic opportunities available to a society are not increased by transferring capital from the private sector to the government.

Ervin, Faulk, and Smolira (2009) suggest investing 50 percent of the trust fund in equity. They use Monte Carlo simulation and conclude that individuals need to deposit at least 15 percent of pre-retirement salary for 30 years in a portfolio consisting of at least 50 percent equity to realize a high success rate for portfolio withdrawal.

Shen, Zhu, Wu, and Chen (2019) analyze China's National Social Security Fund (CNSSF) investment in the stock market. They compare direct investment by China's National Council for Social Security Fund versus the investment performance of entrusted social security funds. They conclude that the latter is better than the former. The portfolio management will result in up-normal returns if managed efficiently (The annual risk-adjusted return on entrusted investment is 9.54% higher than direct investment) and probably governed.

In the second part of the paper, we shed light on the relationship between governance and investment decisions. For that, we construct the first Corporate Governance Index (CGI) for all the companies inside the SSIF portfolio. We manually collect governance data on corporate governance practices for all companies listed on the Amman Stock Exchange (ASE) in 2018 and 2019. Then we build the CGI, covering all publicly traded Jordanian firms inside the SSIF portfolio for 2018 and 2019.

Literature reports that governance can be considered a decision tool in stock investments. Some document that corporate governance leads to higher common stock returns, better portfolio performance, and enhanced firm value; investors can evaluate the risk of deviating from proper C.G. practices and determine their investment decisions.

Empirical research examines whether good corporate governance leads to higher common stock returns and portfolio performance. The results were controversial; Bauer, Gunster, and Otten (2004) found a positive annual return advantage of "good Governance Portfolio" over "Bad Governance portfolio with a return premium of 5% for the U.K. portfolio from January 1997 till July 2002. On the other hand, when they test the difference in portfolio performance attributable to governance, they report a negative relationship between good governance and portfolio performance for companies included in the FTESE Eurotop 300 and are not biased by country.

Two closely related academic studies focusing on corporate governance and long-term equity returns are Gompers *et al.* (2003) and Drobetz *et al.* (2003). They both

found governance premium by investing in good-governance stocks over bad-governance stocks in a long-short strategy. Gompers *et al.* (2003) found an excess return of 8.5%, while Drobetz *et al.* (2003) report a remarkable annual excess return of 16.4% to a corporate governance long-short strategy.

On the other hand, Jensen and Meckling (1976) show that better-governed firms might have more efficient operations, resulting in a higher expected future cash flow.

This paper evaluates the implications of investing a percentage of the social security fund in equities using asset selection techniques. Further, this paper examines whether corporate governance can be related to better performance and be used as an additional criterion for sound investment decisions.

Social Security believes investing a portion of trust fund assets in equities would likely reduce the need for higher payroll taxes and strengthen the program's long-term financial outlook. However, the policy shift exposes the program to higher financial risk. Aggregate investment and long-term asset values move in opposite directions. In the second part of the paper, we construct a corporate governance index for all the companies included in the SSIF portfolio to shed light on the relationship between governance and sound investment decisions.

The rest of the paper is organized as follows: Section 2 discusses data and presents the equity portfolio; Section 3 discusses methodology, asset selection, and portfolio performances. Section 4 discusses the change in market capitalization. Section 5 discusses the empirical results, and Section 6 has conclusions and implications.

2. Data and Equity Portfolio Characteristics

Two separate data set is used, namely the data for equity returns and investment proportions and the data for constructing the CGI.

2.1 Data and Equity Portfolio Characteristics

Data include daily and monthly stock prices of assets invested in the social security equity portfolio from 2006 to 2019. Returns are computed from recorded prices, transaction prices, or indicative quotes and correspond to typical trade sizes. Data also include quantities invested in each stock inside the equity portfolio and is adjusted whenever changes in quantity happen because of trade (buying and selling activity). Data are from the Amman Stock Exchange (ASE) daily and monthly reports. Quantities invested are from Jordan Securities Commission and SSIF.

The strategic portfolio is passive and aims to establish a well-diversified portfolio of securities without specifying under-or-overvalued stocks. The current diversification is inefficient, and tracking the market (using a "homemade "index fund designed to

simulate the ASE) is neglected. Being passive does not mean leaving the portfolio intact. An investor must change the portfolio's composition and reap the portfolio value's appreciation from time to time. Else there is no benefit from being passive.

The considerable investment in ASE left the SSIF equity portfolio vulnerable to any adverse shock in a small illiquid market like Jordan's. The market witnessed three huge jumps and collapses in prices for three years (2005, 2006, and 2008) of unusual hikes and collapse in stock prices during ASE's history. SSIF portfolio managers thought that the pull (surge) of 2005 and the bear of 2006 and 2007, 2008 represent an economic business cycle while it was an exceptional three-bubble year.

The year 2005 was bullish market sentiment aggravated by inefficiencies in the stock market. The index continues to decrease more until a new balance comes to exist. This balance is more directed to small and neglected firms searching for speculative income.

Stock market capitalization drops more than 82 percent between 2005 and 2019, exposing the SSIF equity portfolio to a massive loss of value of approximately 51 percent. According to Patal and Sarkar (1998) and Mishkin and White (2002), a stock market crash is defined as an event when the regional price index declines, relative to the historical maximum, more than 20 percent for the developed markets, and more than 35 percent for the emerging markets.

The Jordan stock market suffers from a lack of depth and breadth. The lack of depth in the ASE makes it challenging to liquidate without significant loss in value. SSIF's equity portfolio comprises more than 13% of ASE's total market capitalization. It is one of the few market makers, and any trading move is considered a direct signal to all other traders to follow and replicate, making things more complicated for the fund. The high illiquidity in the stock market is an added risk to the total risk the social security equity portfolio faces.

Around the market crash of late 2005, 2006, and 2008, return volatilities and correlations increased dramatically, and seemingly unrelated positions suddenly all moved in the same direction, causing a magnification of the effect.

The direct relationship between risk and return holds during the study period; Beta coefficients of market return are positive. There is considerable evidence of leptokurtic in stock market data (Fat tails) in equity returns. The distribution is peaked relative to the normal.

Variance Covariance (VCOV) and correlation maps are studied in two different periods to stand on covariance changes and correlations during good times and bad times. The correlation map of the SSIU equity portfolio during 2006-2007 shows poor diversification. The banking portfolio is poorly diversified with a high concentration in one bank (the Arab Bank), while the industrial sector is well

diversified. The insurance sector is highly diversified, and the service sector is less diversified. In what follows, we calculate a track of portfolio concentrations. This step is essential to show whether the S.S. portfolio is well-diversified among its portfolio's investments. Weights are presented in Table 1 for each primary sector in the years 2006 and 2018.

Table 1 shows that the S.S. stock portfolio is heavily invested in the banking sector, followed by service, industrial, and insurance. In 2006 72.51% of the S.S. equity portfolio was invested in the banking sector, 14% in the service sector, 13% industrial sector, and 0.22% in the insurance sector.

The unpleasant market conditions that caused collapses in stock prices in 2018 caused investments weights inside the portfolio to decline by almost 11% in the banking sector, increased by 5.55%, and by 0.79% in the service and the industrial sectors, respectively, and declined by 0.02% in the insurance sector. The S.S. portfolio is heavily concentrated in the banking industry in the two study periods. These concentration imbalances may be justified because the banking sector is the most well-established business in Jordan.

If we look deeper inside each sector, more exciting results emerge. In 2006, the banking portfolio was heavily concentrated. Three leading banks amount to 92.25% of the banking sector portfolio investments. In 2018, one of the leading bank's weights dropped to 51.95%, causing a significant change in the whole portfolio's market cap; actually, weights declined drastically because of collapses in bank market prices.

Table 2 also shows in 2006 that the industry portfolio is heavily concentrated in four large companies. The total weight of these four investments amounts to 88.37% of the industry portfolio. In 2016 the total weights of these four investments jumped to 93.83% of the industry portfolio.

In 2006 the Service sector was heavily concentrated in three primary investments that amounted to 74.3% of the service sector. The total weights of these three investments collapsed to 28.35% in 2018 because of price deterioration. We neglect the insurance sector due to the small size of the investment involved.

The S.S. stock portfolio is heavily concentrated. In 2006, 10 companies amounted to 89% of the full portfolio and declined to 77.35% in 2018. Now, in 2018, 13 companies amount to 90% of the entire portfolio.

2.2 Data and methodology for Constructing CGI

The literature on the importance and effect of corporate governance is vast, but literature on constructing the Corporate Governance Index is minimal. The work of Black, De Carvalho, and Gorga (2012), Balasubramanian, Black, and Khanna,

(2011), Black, Jang, and Kim (2006a), Ararat, Melsa, Black, Bernard, Yurtoglu, and Burcin (2016), and Black, De Carvalho, Khanna, Kim and Yurtoglu (2019) are some of the main works in this area. We adapt these indices to fit the Jordan environment.

Table 1. *Concentration ratio (CONC) of different sectors inside the equity portfolio for (2005-2007) and (2006- 2019)*

Sectors	*CONC_IND*	*CONC_SR*	*CONC_IN*	*CONC_BK*
	*2006**			
Weights	*12.7%*	*14.56%*	*0.22%*	*72.51%*
	*2018**			
Sectors	*CONC_IND*	*CONC_SR*	*CONC_IN*	*CONC_BK*
Weights	*13.49%*	*20.11%*	*0.20*	*66.2%*
Change	*Increase*	*Increase*	*Decline*	*Decline*

Note:
** Average yearly weights*
CONC_IND stands for weight concentration in the industry.
CONC_SR stands for weight concentration in the services.
CONC_IN stands for weight concentration in insurance.
CONC_BK stands for weight concentration in banking.
Source: *Own study.*

Table 2. *Within sector concentration ratios*

Year	Sector	Price Weight
2006	Banking Sector/ Three Main Investments	92.25%
2018		89.11%
2006	Industrial Sector/ Four Main Investments	88.37%
2018		93.82%
2006	Service Sector/ Three Main Investments	74.29%
2018		28.35%

Source: *Own study.*

Black, De Carvalho, Khanna, Kim, and Yurtoglu (2019) find that well-constructed, country-specific "corporate governance indices" can predict higher firm values in emerging markets. The researchers study that question across four major emerging markets (Brazil, India, Korea, and Turkey) and build an overall country-specific governance index. The index includes indices for disclosure, board structure, ownership structure, shareholder rights, board procedure, and control of related party transactions.

The main findings are: (i) Disclosure (especially financial disclosure) predicts higher market value across all selected countries, (ii) Board structure (principally board independence) has a positive coefficient in all selected countries, and only

significant in two countries, (iii) Ownership structure, shareholder rights, board procedure, and control of related party transactions indices do not predict firm value.

Ararat, Black, Bernard, Yurtoglu, and Burcin (2016) studied the Effect of Corporate Governance on Firm Value and Profitability in Turkey from 2006 to 2012, relying on hand-collected data covering most listed firms. They built a Turkey Corporate Governance Index (TCGI), composed of five sub-indices for board structure, board procedure, disclosure, ownership, and shareholder rights. The disclosure sub-index is the principal sub-index that predicts higher market value and profitability and drives the index results. Ararat et al. main findings are that TCGI predicts higher market value (with firm fixed effects) and higher firm-level profitability with firm random effects.

Chen, Kao, Tsao, and Wu, (2007) test the relationship between ownership/leadership structures and stock returns for firms listed in Taiwan. They built a Governance Index based on four different aspects of the company's governance structure: CEO duality, size of the board of directors, managements' holdings, and block shareholders' holding. They consider this index as a proxy measure of the effectiveness of the corporate governance mechanism in Taiwan. Chen *et al.* (2007) find a strong relationship between the governance index and stock performance**.**

We construct our tailored CGI, which is composed of five sub-indices, including 60 variables. Elements suggested by previous literature and fit the Jordanian environment are considered potential indicators of acceptable governance practices by corporations in Jordan. Most variables are coded as "1" if a firm has the attribute and "0" otherwise. We construct a CGI for listed firms in the corporate sector for 2018 and 2019 using information related to four important corporate governance mechanisms, namely, Board Structure, Board Procedure, Disclosure, Ownership Structure, and Minority Shareholder Rights. Then different elements inside each sub-index are determined. The elements of each sub-index reflect Jordan-specific norms and institutions.

We manually collect governance data on corporate governance practices for all companies listed on the Amman Stock Exchange (ASE) in 2018 and 2019.

Information about corporate governance dimensions of Board Structure, Board Procedure, Disclosure, Ownership Structure, and Minority Shareholder Rights are collected manually from own company's annual reports, corporate governance compliance reports and charters, The Securities Depository Center (SDC), and the Amman Stock Exchange (ASE).

CGI covers all publicly traded Jordanian firms. CGI is comprised of five equally weighted sub-indices; (1) Board Structure, (2) Board Procedure, (3) Disclosure, (4) Ownership Structure, and (5) Minority Shareholder Rights. Inside each sub-index,

elements are given equal weights based on the different elements inside these sub-indices. Table 3 describes the sub-indices and attributes in each sub-index.

Table 3. *CGI Sub-indices and elements*

Code	Elements of Governance
BOARD STRUCTURE	
Bs1	The firm has at least one independent director.
Bs2	The firm has more than one independent director.
Bs3	The audit committee has a non-executive or independent chair.
Bs4	The audit committee has an independent member.
Bs5	CEO (if onboard) and chairman are different people
Bs6	CEO (general manager) on the board
Bs7	Is the (general manager) an outsider
Bs8	A corporate governance committee exists.
Bs9	The board consists of not less than three and not more than 13 members.
Bs10	There is a policy to specify the professional qualifications & training requirements for the board.
BOARD PROCEDURES	
Bp1	The firm has a code of ethics or conduct.
Bp2	Corporate governance policy or board charter governs the board process.
Bp3	The firm discloses the membership of the audit committee.
Bp4	Firm discloses audit committee charter.
Bp5	The firm has an internal audit function.
Bq6	The board implemented a performance measurement process to assess executive management performance.
Bq7	The board has a nominations & compensation committee chaired by an independent director (or non-executive director)
Bq8	Board has implemented a mechanism to receive shareholder complaints and suggestions.
Bq9	The board adopted and implemented a firm risk management plan.
DISCLOSURES	
Dis1	The firm puts annual financial statements on the firm's website.
Dis2	The firm puts quarterly financial statements on the firm's website.
Dis3	The firm discloses material events on the firm's website.
Dis4	The firm puts annual reports on the firm's website.
Dis5	The firm puts C.G. compliance reports separately on the firm's website.
Dis6	The firm puts an annual agenda of corporate events on the firm's website.
Dis7	Firm articles of association available on firm website
Dis8	The firm includes shareholding voting information on the firm's website.
Dis 9	The firm prepares English language financial statements.
Dis10	The firm discloses the list of insiders.
Dis11	The firm discloses shareholdings of individual directors.
Dis12	CG charter or guidelines disclosed.
Dis13	Code of conduct or ethics code disclosed.
Dis14	Information on the last AGM disclosed
Dis15	Board members' current roles are disclosed.

Dis16	The board member's background (education, Employment, history) is disclosed.
Dis17	Board members date of joining the board disclosed
Dis18	The background of senior managers is disclosed.
Dis19	Information on internal audit/control is disclosed.
Dis20	The number of meetings/years is disclosed.
Dis 21	Board resolutions are disclosed.
Dis22	The executive director's numeration policy is disclosed.
OWNERSHIP STRUCTURE	
Own1	Control structures that are not proportional to share ownership are disclosed.
Own2	There are no ultimate controlling shareholders.
Own3	The firm has no class of shares with multiple voting rights.
Own4	The firm has an outside block holder with more than 5% of shares.
Own5	The firm has managerial equity ownership.
Own6	Institutional and foreign shareholding exists.
SHAREHOLDER RIGHTS	
Sr 1	All shareholders have access to their ownership records and documents maintained by the company.
Sr 2	Shareholders have access to the general assembly meeting minutes.
Sr 3	Shareholders have the right to file lawsuits (or any alternative means of dispute settlements) against the board, board member(s), and general manager in the case they feel the company is at risk because of their actions.
Sr 4	Major shareholders who hold 10% or more can request extraordinary general assembly meetings.
Sr 5	Existing shareholders have a priority to subscribe to any new share issuance.
Sr 6	Shareholders receive dividends within forty-five days from the date taken by G.A. to distribute them.
Sr 7	Shareholders participate in and are informed about fundamental decisions.
Sr 8	Shareholders can participate effectively and vote in the GSM.
Sr 9	The control structure of the enterprise is transparent and can change based on the needs of the shareholders.
Sr 10	Shareholders within the same class are treated equally.
Sr 11	The firm has an insider trading policy.
Sr 12	The firm does not have any loans to the director or has a policy limiting these loans.
Sr 13	The firm has an investor relations officer/ department.

Source: *Own study.*

We construct the Jordan Corporate Governance Index (CGI) in two steps. In the first step, we construct a sub-index for each of the four corporate governance components selected; we specify the number of governance requirements according to best practices and the governance guidelines applied in Jordan and existing literature.

We give each sub-index equal weight assigned to each element based on each corporate governance component's total number of elements. In the second step, we average the four sub-indices values to arrive at the overall Corporate Governance

Index (CGI). The total CGI score is an average of the sub-index scores. In constructing the CGI, we follow the Ararat et al. (2019) method and related specifications.

3. Methodology: Optimal Portfolio, Asset Selection, and Portfolio Performance

Some developed decision rules allow us to reach an optimal solution to a practical portfolio problem without solving mathematical programming problems (Elton *et al.,* 1976). Using the single-index model's standard form to describe the relationship between risk and return directly relates the desirability of any stock to its risk-adjusted excess returns.

The single index model will adequately describe the variance-covariance structure. The excess return to the beta ratio measures how much the market is willing to pay securities over the risk-free rate per unit of systemic risk (Elton *et al.,* 2007). Elton *et al.* (1976) developed a simple decision criterion to reach an optimal solution to the portfolio problem and its related security and weights. \

In this paper, we adopt the Elton *et al.* (1976) procedure. The excess return to Beta ratio is used as a decision rule to rank included stocks in the portfolio. How many stocks are selected depends on a special cut-off rate (C^*) (For more details, see Elton *et al.*, 1976; 1977)[5].

Relative investments (weights) in each security is calculated using this formula:

$$I_i = \frac{\beta_i}{\sigma_{ei}^2}\left(\frac{\bar{R}_i - R_F}{\beta_i} - C*\right)$$

[5]*To find the optimum* C_i C^**, stocks are ranked by the excess return to risk from highest to lowest. For a portfolio of i stocks* C_i *is given by:*

$$C_i = \frac{\sigma_m^i \sum_{j=1}^{i} \frac{(\overline{R_J} - R_F)\beta_J}{\sigma_{ej}^2}}{1 + \sigma_m^2 \sum_{j=1}^{i}\left(\frac{\beta_j^2}{\sigma_{ej}^2}\right)}$$

σ_m^2 *= the variance in the market index*

σ_{ej}^2 *= the variance of the stock's movement that is not associated with the stock index movement. This movement is usually referred to as a stock's unsystematic risk.*

4. Empirical Results of the Formation of the Optimal Portfolio Based on the Index Model

After ranking securities according to excess return-Beta ratio and after calculating the cut-off rate (C^*), the securities that must stay in the SSIU portfolio are:

Table 4. *Asset selection for the periods 2006-2011, 2012-2018, and 2006-2018*

No. of Companies*	2006-2011	2012-2018	2006-2018
Asset Selected	6	18	8
% **	8%	25%	13%

Note: **Company name details can be provided upon request. ** Percentage of total assets invested in the S.S. portfolio.*
Source: *Own study.*

Table 4 shows that at least 75% of the stocks invested in the S.S. trust fund are selected on arbitrary bases and not on a risk-adjusted base; optimality is not a concern. Results are robust for the three-time period specification. Securities that pass the stock's inclusion test to join the S.S. portfolio are very little, especially when the whole period is considered. Table 2 led us to conclude that S.S. investments were not managed well; the inclusion of securities inside the equity portfolio was ad hoc. This result can be derived because the average portfolio return of the entire S.S. stock portfolio is -0.33 from 2006 to 2018, as shown in Table 4.

Sharpe ratios were not a surprise; Sharpe measures are negative 0.296 for the period 2006-2018. The average portfolio return is less than the risk-free rate. Saving money in banks will return 4.25% on average (2006-2018), while investing in the stock market for the same period will result in an average negative of 33.0% (the last row in Table 4 shows that the average return difference between S.S. equity investments and the depository rate during the 12 years shows -4.58%).

It is much safer and more profitable to save money in the bank. Shifting funds for investing in the stock market is risky and costly; generations are already paid twice when the S.S. increases payroll tax and retirement age. Compared to other Sharpe ratios measured from the optimum selected stocks, Table 5 shows a positive Sharpe ratio of 1.018 in 2006-2012, -0.063 in 2012-2018 and 2.33 in 2006-2018. Treynor measure reaches similar conclusions.

Table 5. *Portfolio return, standard deviation, and Sharpe ratio.*

	Asset selection 2006-2011	Asset selection 2012-2018	Asset selection 2006-2018	Without Asset Selection 2006-2018
No. Co	6	18	8	All stocks
Rpt*	3.0%	0.223%	1.098%	-0.33%
S.Dp**	2.59%	2.10%	0.32%	2.4%

Sharpe	1.018	-0.063	2.23	-0.296
Treynor	1.47	-0.69	0.52	-0.77
Avg. D.R.	4.57%	3.98%	4.25%	4.25
Rpt-Avg. D.R.	-1.57	-3.76	-2.27	-4.58

Source: *Own study.*

Table 6 presents a routine to calculate the optimal weights inside the optimal portfolio from 2006 to 2018. Table 6 shows that the actual weights are far from optimal.

Table 6. *Optimal weights for the selected portfolio (2006-2018)*

Selected companies stocks$_i$	Actual weights %	Optimal portfolio weights %
Company 1	9.20	0.37
Company 2	0.001	0.12
Company 3	0.02	0.068
Company 4	2.56	0.238
Company 5	0.07	0.11
Company 6	0.01	0.05
Company 7	1.29	0.038
Company 8	2.1	0.0065

Source: *Own study.*

Policy discussions of social security portfolio diversification into more equity have concentrated on the consequences of maximizing retirement benefits, ignoring proper portfolio management techniques and risks involved have resulted in the loss of value and reduced expected retirement benefits. This policy may justify the recent amendments to the S.S. low No. 1 of 2014 and future suggestions mentioned in the S.S. corporation's eighth actuarial review.

For example, maximum insurable earnings for deterring contributions and benefits are limited to 3000 JDs for persons who joined the scheme for the first time on or after 15 October 2009 and 5000 JDs before 2009. Monthly deductions had increased from 18.75 in 2012 to 21.75 % in 2017. It is also recommended that the average retirement age be gradually increased from (60 males/55 females to (65 males/60 females over thirty years starting in 2021 (eighth Actuarial Review of the Social Security Corporation as of 31 December 2013, page 73).

Recently S.S. Corporations passed a suggested amendment that will cancel early retirement to all new participants.SSIF portfolio returns were always less than actual returns gained from just depositing money in saving deposits (Tables 5 and 7).

5. Building Corporate Governance Index (CGI)

We build CGI for all the securities inside the S.S. portfolio and asset selection portfolios listed in Table 3 above to stand on the relationship between corporate

governance and better asset selection. Table 8 shows individual companies' governance and composite indices for different asset selection for 2006-2018. We calculate further the CGI for the S.S. portfolio without asset selection. Because this CGI is the first corporate governance index in Jordan, we assume constant historical ratings. This assumption is also adopted by Drobetz *et al.* (2003).

Table 7. *Savings rates versus portfolio return (2006-2018).*

Year	Saving Rates*	Portfolio Returns
2006	5.13	-4.183925803
2007	5.56	3.081698426
2008	5.66	-0.522085757
2009	4.23	-0.385671505
2010	3.4	-0.200179428
2011	3.46	-1.07511979
2012	4.19	-0.14217462
2013	4.97	-0.138766987
2014	4.11	-0.086356269
2015	3.06	0.259984647
2016	3	-0.446772596
2017	3.8	-0.283846516
2018	4.7	-0.541636506

Note: ** Rates are average annual rates as published by the central bank of Jordan.*
Source: *Own study.*

Table 8. *CGI of different portfolio specifications*

	Asset selection 2006-2011	Asset selection 2012-2018	Asset selection 2006-2018	Without Asset Selection 2006-2018
No. Co	6	18	8	All securities
CGI	62.29%	69.52	58.05%	71.9
Rpt*	3.0%	0.223%	1.098%	-0.33%
S.Dp**	2.59%	2.10%	0.32%	2.4%
Sharpe	1.018	-0.063	2.23	-0.296
Treynor	1.47	-0.69	0.52	-0.77

Source: *Own study.*

Overall, asset selection CGI's are less than the CGI of the whole portfolio (without asset selection). For example, the portfolio's CGI using assets selection for 2006-2011, 2012-2018, and 2006-2018 are 62.29%, 69.52, and 58.05%, respectively, while the whole passive managed portfolio's CGI is 71.9%. When comparing the same period 2006-20018, the portfolio CGI using asset selection is 58.05%, while the overall CGI without asset selection is 71.9%.

Results in Table 8 also show that asset selection increases portfolio returns while also linked to lower governance of the portfolio. The highest average returns are

associated with the lowest CGI and correspond to the lowest risk level (measured by the standard deviation of 0.32%) among lower than average good, governed portfolios. Portfolio performance is better for less governed portfolios. Sharpe and Treynor's measures for less governed portfolios are positive and above the passive portfolio (except for 2012-2018 due to overall bad economic conditions). Results show that a less governed portfolio earns higher than average returns and performs better than a better-governed portfolio.

We further calculate correlations between CGI and each of the returns and performance measures. Results in Table 9 shows that returns and performance are negatively correlated with the level of corporate governance. This finding goes in line with the results of Lehmann & Weigand, 2001, as they found a significantly negative relationship between corporate governance efforts (measured by the ownership concentration) and the levels of profitability (measured by the return on total assets).

Table 9. *Correlation matrix between CGI and: Returns, Sharpe, and Treynor ratios (all assets 2006-2018).*

Corporate Governance Index	Returns	Sharpe Ratio	Treynor Ratio
CGI	-3.16%		
CGI		-0.035	
CGI			-0.189

Source: *Own study.*

6. Conclusions and Implications

Social Security believes that investing a portion of trust fund assets in equities would likely reduce the need for higher payroll taxes and strengthen the program's long-term financial outlook. However, the social security trust fund's policy shift towards more equity investment reduces the aggregate capital stock and exposes future generations to more uncertainty.

Evaluating the common perceptions that investing the trust fund into the stock market would save the Social Security system by capturing the equity premium that stock enjoys over other instruments shows negative equity premium over the period from 2006 to 2018, Sharpe ratio is negative. The fund management overstates the benefits of stock investments for social security.

Overall, the portfolio of asset selections' CGI is less than the CGI of the whole portfolio. Asset selection increases portfolio return while also linked to lower governance of the selected stock portfolio. Results show that a less governed portfolio earns higher than average returns and performs better than a better-governed portfolio. Correlations between CGI and each of the performance measures are negative.

One of the main implications of this paper is that if good governance is the major concern of funds, then shifting assets into more fixed income instruments might be a good substitute to generate income, given that good-governance portfolios are associated with a lower return and risk-adjusted-performance.

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