# Progressive Sovereign Wealth Funds

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**Abstract**

Equity and efficiency can both be promoted, under some circumstances, by means of a sovereign wealth fund that mainly invests in the world stock market and whose gains are earmarked to a social dividend. A simple overlapping generation model with a fraction of hand-to-mouth agents is developed in which the government uses public debt to create such a fund. The socially optimal size of the fund is strictly positive and determined according to a formula that can be empirically implemented. While this policy is similar to popular capitalism in aiming at a more egalitarian distribution of capital income, it is predicated on a different notion of good society.

JEL-Classification: H1.

Keywords: SWF, public ownership, inequality, popular capitalism.

# 1 Introduction

This paper revisits the idea that some public ownership of capital can be an effective tool for achieving a more egalitarian distribution of income in advanced economies without suffering a loss of efficiency. I analyze a debt-financed sovereign wealth fund (SWF) that mainly invests in the world stock market and rebates its net returns to the citizenry by means of a social dividend; I call it a "progressive SWF". This institution would make every citizen share in the high rates of return from capital investment that come along with globalization and automation. Being tied to capital incomes that are often predicted to grow more rapidly than labor incomes, the social dividend provided by a progressive SWF would generate a lasting reduction of poverty and inequality. My goal is to spell out this policy proposal and scrutinize its ramifications within a simple overlapping generation model.[1]

Some empirical observations may help appreciating the potential for public ownership of stocks as a redistributive tool. First, in many countries the labor share in national income displays a downward trend (Karabarbounis and Neiman, 2014; Autor et al., 2020; Barkai, 2020; Dao et al., 2017; vom Lehm, 2018). Such a trend implies that the potential redistributive effect that could arise from public ownership of capital is increasing. The incipient robot revolution is likely to push forward this shift in the functional distribution of income, possibly to a dramatic extent (Berg et al., 2018; Dauth et al., 2017; Mookherjee and Ray, 2020).

Second, younger cohorts of workers face a substantially more unequal distribution of lifetime earnings than their predecessors. The bottom quartile even displays a decrease of real lifetime earnings in absolute terms, as documented for the US by Guvenen et al.

[1] Related proposals have been formulated by Meade (1984), Atkinson (2015), and Corneo (2018a). The idea that the government should use debt to acquire ownership of some commercial assets and that the ensuing returns, net of costs of finance, should be used to improve the equity/efficiency trade-off goes back to Gossen (1927, originally published in 1854) and Walras (1880-1881). A contract-theoretic justification for the comparative advantage of the government as a creditor and provider of liquidity is offered by Holmström and Tirole (1998).

(2017a) and for Germany by Bönke et al. (2015). The robot revolution is likely to worsen also this trend (Acemoglu and Restrepo, 2020; Prettner and Strulik, 2017).

Third, the ability of trade unions to foster workers' welfare has been eroding: union membership has been declining in the private sector over the last three decades in most advanced economies; union coverage of wages has similarly declined and collective wage bargaining, where it still occurs, has increasingly been decentralized to the firm level. It is difficult to imagine that these trends could be reversed any soon. They were driven by structural economic changes and an erosion of the social norms that prompt individuals to join a trade union (Corneo, 1995; Goerke and Pannenberg, 2005).[2]

The current debate on inequality and redistribution tends to focus on capital taxation rather than public ownership of capital. However, as cautioned e.g. by Stiglitz (2015), capital taxes are shifted to some extent onto workers by means of lower wages and higher prices for consumption goods. Because of the disincentives it would create, it is difficult to predict the budgetary consequences of a large increase in capital taxes.[3] Moreover, international tax competition with respect to highly mobile capital and top earners is intense and unlikely to get softer in the future.

Against this background, I propose to enhance the role of public ownership of capital by mainly using public debt to establish a SWF that invests in risky assets, mainly stocks, and whose net returns are distributed to citizens through a social dividend - a monthly or quarterly universal transfer payment. The SWF of a triple-A country could borrow

[2]Even with some redressing of the bargaining power of unions, one would not have improved the situation of the workers in non-unionized firms. In countries like Germany, a stronger bargaining power of unions would deepen the dual structure of labor markets: higher wages in the unionized sector decrease labor demand in this sector and thus increase the supply of workers to the non-unionized sector, which tends to decrease wages there. If the unionized sector pays higher wages to begin with, this tends to increase wage inequality.

[3]Empirical simulations of the Laffer curve of capital taxation by Trabandt and Uhlig (2011) suggest that unintended consequences of raising capital taxes are likely, unless the tax increase is moderate. Fuest et al. (2018) find that about half of the corporate tax is borne by workers, especially the low-skilled. Personal wealth taxes and taxes on wealth returns are often avoided or evaded by the wealthiest households, e.g. using offshore investment schemes; Alstadsaeter et al. (2019) find that in Scandinavia 3% of such personal taxes are evaded on average, but this share raises to 25%-30% in case of individuals in the top 0.01% of the wealth distribution.

at a long-term interest rate close to zero and expect to earn an annual rate of return on its investment close to 7%.[4] Also countries with a somewhat inferior financial reputation would expect to gain from such a policy.

Do countries with strong public finances therefore face a genuine free lunch? If all households optimize and trade on a complete set of perfectly competitive markets, the first welfare theorem says that there is no free lunch. More precisely, under those conditions the above described policy will have no effect whatsoever. The reason is akin to the one for the Ricardian equivalence of public debt and taxation as alternative means to finance a given public expenditure (Barro, 1974; Stiglitz, 1988). If the government borrows, buys stocks, and rebates its net return to the households as a lump sum, the latter would take the budgetary effects of this policy into account in their asset management decisions. This would entail a reduction of their net demand for stocks so as to exactly offset the purchase of stocks made by the government. Eventually, nothing in the risk profile of the total portfolios of households – including their implicit share in the government's portfolio - would change, and the government's policy would be neutral with respect to their consumption opportunities. Despite the government cashing-in the equity risk premium, the households' expected utilities would be unaffected.

The intuition behind this irrelevance result is simple. By rebating the equity risk premium to the households, the government acts as their representative when it swaps debt for stocks. Since markets are perfect by assumption, it undertakes something that could have been undertaken by the households as well, and the consequences of its undertaking are borne entirely by them. Since private households optimize, there is no way in which they can benefit from this policy.

Ricardian equivalence requires heroic assumptions on market structure and agents' rationality. Empirical research in household finance has put forward various robust findings

[4]See e.g. Daly (2016). This is in line with historical evidence on the equity risk premium surveyed by Mehra and Prescott (2008) and can be reconciled with results from a battery of estimation models, as shown by Duarte and Rosa (2015).

that clash with them. A prominent one is the "participation puzzle": even in economies with highly developed financial markets, many households do not invest in stocks and other risky assets despite their high mean return. This is a puzzle because risk aversion is a second-order phenomenon in mathematical terms, so that even strongly risk-averse agents with a low level of wealth are expected to invest in risky assets if they optimize. The resolution of this puzzle involves pecuniary and cognitive costs of participating in markets for risky assets. These costs create an insider/outsider divide such that individuals with low education and low income are especially unlikely to trade in those markets.

The optimization assumption behind Ricardian equivalence may be an acceptable one for some households in the upper part of the income distribution. For a substantial part of the population, actual behaviour seems to be more accurately described by the passive hand-to-mouth agents put forward e.g. by Mankiw (2000). I will thus develop an overlapping generation model with two types of agents: optimizers and hand-to-mouth. My model builds upon a similar one offered by Diamond and Geanakoplos (2003), and extends the one presented in Corneo (2018b). In the status-quo, it features a stationary stochastic economy with a pay-as-you-go social security that provides an old-age income to the hand-to-mouth agents. The latter are also referred to as "workers", while the former are called "savers"; both types are assumed to be risk-averse. The savers purchase a safe asset and a risky one. These financial assets are backed by two technologies that respectively produce safe and risky output. Competitive markets determine all relative prices. Starting from here, I investigate the effects of creating a SWF that in every period emits safe debt, uses the proceeds to acquire the risky asset, and rebates its net return uniformly to all households that are alive in that period. In such a model, the kind of Ricardian equivalence described above does not hold and the SWF turns out to increase the expected lifetime utility of all households.

This is a strong result because it shows that public ownership of capital can increase the lifetime welfare of the workers without reducing the lifetime welfare of the savers.

More precisely, all savers that are born after the creation of the SWF are made strictly better-off by this policy. Hence, a progressive SWF does not require efficiency to be sacrificed for more equality: it promotes both. The main intuition behind this Pareto gain relates to the participation puzzle. In the status-quo, the workers bear no financial risk but, as long as the equity premium is positive, would benefit from undertaking some. This is precisely what is brought about through the establishment of a progressive SWF. Such a policy delivers a genuine free lunch because it reduces the initial inefficiency in the asset allocation of the economy by moving the level of risk-taking closer to the optimal one.

An important qualification concerns the need for some accompanying capital taxation. If the interest rate on the safe asset is not pinned down by the technology – as in my baseline model – but is determined in financial markets, emitting public debt to acquire stocks may lead to an increase of the interest rate. This in turn has the effect of increasing the cost of refinancing the initial public debt, which must ultimately be matched by an increase of the primary surplus of the government. This necessity to raise taxes threatens to kill the Pareto-improvement result. I show that a capital tax equal to the gain in interest income reaped by the savers can fill the gap in the government budget and uphold the Pareto improvement.

Before presenting the formal analysis in section 3, the next section summarizes the empirical literature in household finance that documents the extent to which households hold inefficient portfolios. Section 3 develops the baseline model, and section 4 extends it in various directions. Section 5 puts forward some institutional requirements for such a fund as well as some options that would come along with its creation. The final section 6 contrasts this policy proposal with the one of popular capitalism. While a progressive SWF is a collective institution of public wealth management, popular capitalism advocates policies that induce every single member of society to take responsibility for saving and portfolio-management.

# 2 Households and the stock market

In their authoritative survey of the literature on household finance, Gomes et al. (2021, p. 929) write: "The most important fact that emerges from analysis of the equity allocations of households is that a large fraction of the population simply does not own any stocks." Even in economies with highly developed financial markets, more than half of the households do not invest in stocks and other risky assets despite their high mean return. In Germany, for example, only about one fifth of the household population owns stocks, either directly or indirectly through mutual funds, ETF, and retirement accounts (DAI, 2016; Deutsche Bundesbank, 2016). Such a violation of the participation principle is more common among the relatively poor; in the US, only a minority of households in the bottom half of the wealth distribution owns public equity (Campbell, 2018).[5]

Another robust finding in the literature on household finance is the violation of the diversification principle: among the households who do invest in stocks, many hold just a few of them. These households earn a return which is too low, given the high financial risk they bear. Underdiversification is a stylized fact of household finance across the world (Guiso and Sodini, 2013). For the US, Polkovnichenko (2005) finds that the median number of stocks held by households who invest in individual stocks is two or three, depending on the year. Poor diversification is often attributable to investments in employer stock, i.e. stock of the company for which the stockholder is an employee. As shown e.g. by Dimmock et al. (2014), lack of diversification typically takes the form of a bias toward a few familiar assets.

What explains the limited participation of households in the stock market and the underdiversification of their portfolios? Mankiw und Zeldes (1991), Haliassos und Bertaut (1995), and Vissing-Jorgensen (2004), among others, put forward fixed participation costs

[5] Gomes et al. (2021) quote a dozen studies that document limited investment in stocks, both direct and indirect, in many developed countries. Updated estimations of participation rates with respect to both stocks, mutual fund shares, and pension funds are offered online by the OECD at: https://data.oecd.org/hha/household-financial-assets.htm.

as the main factor explaining why so many households do not hold equities. These participation costs are not limited to the time and money that must be spent in order to invest in the stock market - costs that have recently been substantially reduced thanks to the development of novel fintech brokerages. Participation costs include cognitive costs involved in learning about the stock market and the market for investment advice and cognitive costs involved in making financial choices one feels confident in. Consistent with this view, Campbell (2006) and Calvet et al. (2007) find that stock market participation correlates with education even after controlling for age, income and wealth; Christelis et al. (2010) find a similar correlation with the ability to perform numerical calculations; Grinblatt et al. (2011) find a similar correlation with IQ. Andersen und Nielsen (2011) and Das et al. (2020) find that such cognitive costs are the main barrier to participation. Chetty et al. (2014), exploiting a rich dataset from Denmark, conclude that about 85% of individuals are passive savers who systematically fail to optimize their portfolios. Jappelli und Padula (2013) and Lusardi et al. (2017) develop models where fixed participation costs keep households with low wealth and human capital out of the stock market.

Cognitive costs may be viewed as the counterpart of the limited cognitive equipment that enables man to make decisions, very much in the tradition of the older literature on procedural rationality and satisficing behavior (Simon, 1976). Cognitive costs may also be viewed as resulting from personal attempts to avoid two behavioral patterns that have been extensively documented in the experimental literature: loss aversion and narrow framing (Barberis et al., 2006). According to the first one, individual decisions are much more sensitive to losses from the status-quo than to gains of the same magnitude; according to the second one, individuals tend to fail to consider the effect of a gamble on their overall consumption opportunities and focus instead on the gamble in isolation. Individuals affected by both loss aversion and narrow framing are therefore likely to keep away from stocks. A third kind of cognitive costs is the fear of being cheated by the asset management industry. Pointing to the high asset management fees that households pay

for poorly performing funds, Malkiel (2013, p.98) stresses that "... perhaps the greatest inefficiency in the stock market is in "the market" for investment advice". Consistent with this view, Guiso et al. (2008) find that households that express reluctance to trust others are less likely to own stocks.

Limited cognitive skills can also explain why many stockholders hold an undiversified portfolio. Barberis and Huang (2001) put forward the loss aversion/narrow framing approach, surmising that many people frame individual stocks narrowly. As mentioned above, underdiversification often means that households tilt their portfolio toward a few stocks that are geographically and professionally close to the household. Bhamra and Uppal (2019) conceptualize familiarity via ambiguity. They posit that households have heterogeneous knowledge about the expected returns of firms whose stock is traded; the more a household lacks knowledge about the true expected returns of a stock, the more it reduces the magnitude of that stock's subjectively expected risk premium.

These departures from normative portfolio theory have far-reaching implications in terms of inequality and welfare. Using Norway's administrative tax records, Fagereng et al. (2020) document that portfolio returns are positively correlated with wealth and that returns are heterogeneous even within narrow asset classes. Results with a similar flavor are reported by Bach et al. (2020) for Sweden. As shown in theoretical models, such heterogeneity in returns can produce over time a large amount of wealth inequality, which is paramount in order to understand the long right tail in the wealth distribution (Benhabib et al., 2011; Lusardi et al., 2017). Using Swedish administrative data, Calvet et al. (2007) empirically estimate the risk properties of household portfolios and find that underdiversification has a significant negative effect on the welfare of the median Swedish household. However, there is a wide variation in efficiency losses across households. Importantly, they find that non-participating households would likely be poor investors in the stock market, earning considerably less than the financially sophisticated households. Similar findings for Austria, Belgium, Germany, Ireland, and Spain are reported by Wenzel and König

(2019). In the static, partial-equilibrium, model that underlies these last two papers the average welfare costs arising from undiversified portfolios are relatively modest. Bhamra and Uppal (2019) extend that framework to a dynamic general-equilibrium model and find that taking the intertemporal general-equilibrium effects into account substantially amplifies the welfare loss from suboptimal household portfolio management: lifetime welfare would hugely increase if wealth were efficiently invested.[6]

# 3 A stylized model

The model in this section captures the finding discussed above in a stylized fashion, assuming that for a share of the household population participation costs are so large that these households are completely passive with respect to finance. This modeling option is the same as in Diamond und Geanakoplos (2003), from which I borrow several further assumptions.

There is a stationary, infinitely-lived, stochastic, closed economy with overlapping generations and a population of mass one. Every individual lives and consumes in two periods and inelasticaly supplies one unit of labor in the first period only. Each generation has two types of individuals: optimizers and financially passive ones. Optimizers are standard neoclassical agents and are called "savers". The financially passive individuals are members of a mandatory pay-as-you-go social security system to which they pay contributions when young and receive a pension when old. In each period they consume their entire disposable income, i.e. they are hand-to-mouth agents. I call these individuals "workers".[7] Both types are assumed to be risk-averse. The mass of workers within each generation is given by $m \in (0, 1)$.

[6] While fintech brokerages like Robinhood have recently contributed to bring new investors into the stock market, these investors are especially likely to earn large negative abnormal returns. Barber et al. (2022) find that average 20-day abnormal returns are -4.7% for the top stocks purchased on Robinhood each day.

[7] Nothing of interest would change if the savers would be assumed to be members of the social security system and continued to save.

There is one perishable good, produced by a competitive industry. This good can be either consumed or invested, in which case it delivers some amount of output in the subsequent period. Firms in which investment take place have access to two linear technologies: a safe one and a risky one. One unit of the good invested in the safe technology yields $1+r$ units of the good one period ahead. The unit return of the risky investment is denoted by $R$; it randomly changes over time and the per-period returns are i.i.d., making the economy a stochastic and stationary one.

The status-quo is a stationary general equilibrium in which both technologies are used. Investment in the safe technology is financed by means of safe assets, called "obligations". Risky investment is financed by means of risky assets called "stocks". Parameters are assumed to be such that in the status-quo savers optimally buy both types of assets when they are young.

This model can be used to evaluate the permanent change in its general equilibrium that is caused by the creation of a small debt-financed SWF that invests in the risky asset and whose per-period return is rebated to the household sector as a social dividend, after subtracting its financial costs. Consider the per-period budget constraints of a representative worker. When young, her budget constraint reads

$$c_1 = w - t^s + \delta_1, \tag{1}$$

where $w$ denotes the wage, $t^s$ is the social-security tax and $\delta$ stands for the social dividend - which is zero in the status-quo. The subscript 1 on consumption and social dividend reveals that these variables refer to the first period of the worker's life cycle. When old, a worker's consumption is given by

$$c_2 = y + \delta_2,$$

where $y$ denotes the social security benefit and the subscript 2 refers to the second period

of the life cycle.

Consider now the savers. When young, a saver's consumption is given by

$$C_1 = W + \delta_1 - K^s - K^u - B. \tag{2}$$

Here, $W$ denotes a saver's earnings, $K^s$ her safe obligations and $K^u$ her risky stocks. In the baseline model there is no pre-existing public debt and these are the only assets available. Once the government issues debt in order to endow the SWF, the savers can also invest in safe government bonds and their investment is denoted by $B$. Notice that the social dividend is the same variable as for the workers because it is a universal transfer within every period. Consumption of a saver when old is then given by

$$C_2 = (1 + r)(B + K^s) + R_1 K^u + \delta_2. \tag{3}$$

Here, I have already taken into account the equilibrium condition that requires government bonds to offer the same return as obligations - because they are identically safe.

Because of stationarity, the budget constraint of social security is simply,

$$y = t^s.$$

The budget constraint of the SWF reads,

$$R_{-1} K^f - K^f = \delta + rD. \tag{4}$$

On its LHS it appears the per-period return of the SWF, where $K^f$ denotes the stationary amount of stocks owned by the SWF at the beginning of each period, after its creation; the subscript $-1$ on its gross return makes clear that the fund receives it on the amount invested at the end of the previous period. As shown by the RHS, the fund's return is used to finance the social dividend $\delta$ and to pay for the interest rate on the debt incurred

to purchase the stocks, $D$. In the status-quo there is no SWF, i.e.

$$K^f = D = \delta = 0,$$

while ex-post you have

$$K^f = D = dK^f > 0$$

for all future periods. I employ the notation $dK^f$ because the analysis is going to focus on the effects from the introduction of a marginal SWF.

In this baseline model, linear technologies pin down the price of labor and the returns to assets, i.e. $w$, $W$, $r$, and $R$. These variables, as well as those pertaining to social security, $t^s$ and $y$, are constant and irresponsive to the introduction of the SWF. This policy alters however the saving and portfolio decisions of the savers, firms' investments, and the transfers received by all households. For given policy (i.e. inexistence or existence of the SWF), the resulting equilibrium is stationary because the invested good perishes after one period. Once the policy is changed (i.e. the SWF is created), the new stationary equilibriurm is reached after one transition period characterized by an "interim equilibrium". I assume that the policy change is credibly announced and taken into account by the generation that faces no SWF when young and faces the SWF when old.

**Proposition**: *The creation of a progressive SWF leads to an ex-ante Pareto improvement.*

**Proof**:

Consider all generations that do not live in the interim equilibrium. A worker's expected utility is given by

$$E[u_1(c_1) + u_2(c_2)] = E[u_1(w - t^s + \delta_1)] + E[u_2(y + \delta_2)], \tag{5}$$

with $u_1' > 0 > u_1''$ and $u_2' > 0 > u_2''$. Using (4) to substitute out the social dividend yields

$$E[u_1(c_1) + u_2(c_2)] = E[u_1(w - t^s + R_0 K^f - K^f - rD)] + E[u_2(y + R_1 K^f - K^f - rD)].$$

To evaluate the effect from the creation of the SWF, use $D = K^f$ and differentiate this expression with respect to $K^f$ to obtain

$$d\{E[u_1(c_1) + u_2(c_2)]\} = E[u_1'(c_1)(R_0 - 1 - r)]dK^f + E[u_2'(c_2)(R_1 - 1 - r)]dK^f.$$

At $K^f = 0$ both $c_1$ and $c_2$ are deterministic; hence, evaluating the change from the status-quo gives:

$$d\{E[u_1(c_1) + u_2(c_2)]\}|_{K^f=0} = \{u_1'(c_1)E[R_0 - 1 - r] + u_2'(c_2)E[R_1 - 1 - r]\}dK^f.$$

The RHS is positive if $E[R_t] > 1 + r$ for every period $t = 0, 1....$ To show that this is indeed the case, switch to the savers who in the status-quo purchase both types of assets when young. This means that the following FOCs must be satisfied:

$$U_1'(C_1) = E[U_2'(C_2)(1 + r)] = E[U_2'(C_2)R_1], \tag{6}$$

with obvious notation. Rewrite the last equation as

$$(1 + r)E[U_2'(C_2)] = Cov[U_2'(C_2), R_1] + E[U_2'(C_2)]E[R_1], \tag{7}$$

which implies,

$$E[R_1] = 1 + r - \frac{Cov[U_2'(C_2), R_1]}{E[U_2'(C_2)]}.$$

Because of (3), $C_2$ and $R_1$ are positively correlated; because of $U_2'' < 0$, it must be the

case that $Cov[U_2'(C_2), R_1] < 0$, which implies $E[R_1] > 1 + r$. This holds true for every period. Therefore, the SWF increases the expected utilities of workers.

Consider now the expected utility of savers:

$$\begin{aligned} E[U_1(C_1) + U_2(C_2)] &= E[U_1(W + (R_0 - 1 - r)K^f - B - K^s - K^u)] + \\ &\quad + E[U_2((1 + r)(B + K^s) + R_1 K^u + (R_1 - 1 - r)K^f)]. \end{aligned}$$

Let us denote their optimal portfolio in the status-quo by $(B^*, K^{s*}, K^{u*})$, with $B^* \equiv 0$, $K^{s*} > 0$ and $K^{u*} > 0$. Once the SWF is established ($K^f = dK^f > 0$), the bonds emitted by the government must be purchased by the young savers; this requires:

$$\left(\frac{1 - m}{2}\right) dB^* = dK^f,$$

where $m$ denotes the share of workers within each generation.

Consider the following feasible portfolio adjustment for the savers in the wake of the creation of the SWF: when young they purchase less stocks than in the status-quo by the same amount as the new per-capita endowment of the SWF: $dK^{u*} = -dK^f$. Furthermore, they buy government bonds as required to clear the market and they reduce their investment in obligations so as to keep the same level of savings as in the status-quo, i.e. $dK^{s*} = -(1 + m)dK^f/(1 - m)$. By construction, this portfolio adjustment perfectly offsets the effects from the creation of the SWF on the second-period consumption of the savers. Although such a feasible adjustment will not in general be optimal for the savers, it would strictly increase their expected utility as compared to the status-quo. This implies that in the new equilibrium, where they optimize, their expected utility must be strictly larger than in the status-quo. In order to verify this claim, compute the savers' expected utility in case they adjusted their portfolios as just described; it is given by

$$E[U_1(C_1^* + (R_0 - 1 - r)K^f) + U_2(C_2^*)], \tag{8}$$

where $(C_1^*, C_2^*)$ denotes the optimal consumption path in the status-quo. Starting from the status-quo, the change in the expected utility of a saver is then

$$d\{E[U_1(C_1) + U_2(C_2)]\}|_{K^f=0} = U_1'(C_1^*)E[(R_0 - 1 - r)]dK^f, \tag{9}$$

where use is made of the fact that the status-quo consumption of the young is deterministic, see Eq. (2). As shown above, $E[R_t] > 1 + r$, $\forall t$, whence the change in expected utility is strictly positive.

Consider now the generation in the interim equilibrium, i.e. the generation that is old when the SWF is introduced. Differently from the generations considered above, this one does not receive a social dividend in its youth. For the workers in this generation, the welfare change produced by the SWF is given by:

$$d\{E[u_1(c_1) + u_2(c_2)]\}|_{K^f=0} = u_2'(c_2)E[R_1 - 1 - r]dK^f > 0.$$

For the savers it was shown above that they can adjust their portfolio so as to completely offset any effect of the SWF on their consumption $C_2^*$ when old. For the interim generation, this implies that it can always reach the same expected utility as in the status-quo. QED

The intuition for this result is closely related to the participation puzzle. In the status-quo, the workers' intertemporal consumption profile is determined by the pay-as-you-go pension system and workers bear no financial risk. As long as the equity risk premium is strictly positive – which must be the case because the risk-averse savers optimally demand stocks in the status-quo – workers benefit from undertaking some financial risk. This is precisely what is brought about through the establishment of the SWF. Such a policy delivers a real free lunch - in terms of expected utilities – because it reduces the initial inefficiency in the asset allocation of the economy by moving the level of risk-taking closer to the optimal one.

This policy generates a Pareto gain, i.e. not only the passive workers benefit from it

but also the optimizing savers. The reason for the latter effect is that even savers cannot optimally undertake risk in their first period of life because this would have required them to enter financial contracts before they were born. Since agents cannot trade risk in financial markets that open before they are born, the first welfare theorem fails and the SWF can make also those agents better-off by trading on their behalf (Farmer et al., 2012). The generation of savers who is already old when the SWF is introduced simply offsets this policy in the Ricardian way and is made neither better-off nor worse-off by that policy. All later saver generations gain strictly.

On the production side, the creation of the SWF increases expected output by shifting investment into the more productive risky technology. This can easily be seen for the first period of the SWF, when the savers adjust their portfolio so as to keep their saving constant. Since the government bonds they purchase are equal to the amount invested by the SWF, what they take out from investment in firms is replaced by the SWF's investment, so that aggregate investment is constant. However, its composition changes because investment in the risky technology increases by

$$\left[1-\left(\frac{1-m}{2}\right)\right]dK^f=\left(\frac{1+m}{2}\right)dK^f>0.$$

Since $E[R]>1+r$, this change in the composition of investment increases expected output. In the subsequent periods, the output effect is even stronger because savers have in expectation a higher expected income when young and thus invest more if consumption is a normal good.

The above Proposition establishes the economic rationale for introducing a debt-financed SWF whose net returns are rebated to the population. Starting from a status-quo without such an institution, creating a small SWF generates a Pareto-improvement. But, what is its optimal size?

As a first step towards a more complete analysis, the current model can be extended in order to get a feeling for the involved orders of magnitude. Consider a straightforward

extension with the same stationary environment as before but define periods to be years and posit that every individual lives $T$ years, so that in every year there are $T$ birth-year cohorts alive. I posit that the social planner treats them equally and chooses the size of the SWF – i.e. how much to borrow in order to buy stocks – so as to maximize the expected lifetime utility of workers, i.e.

$$\max \sum_{\tau=1}^{T} \beta^{\tau-1} E[u(c_\tau)].$$

This may be the objective of a Rawlsian planner; alternatively it would be the approximate objective of a utilitarian planner if $T$ is large enough - because in that case the welfare effect of the SWF on the savers is small as they tend to behave like purely Ricardian agents. Finally, assume for simplicity that the pay-as-you-go system is geared so as to provide workers in the status-quo with a constant level of consumption equal to $y$ in every year. Then, the planner's problem is to find a time-invariant value $K^f$ for the SWF such that

$$\sum_{\tau=1}^{T} \beta^{\tau-1} E[u(y + (R_{\tau-1} - 1 - r)K^f)]$$

reaches a maximum. The FOC of this problem reads

$$\sum_{\tau=1}^{T} \beta^{\tau-1} E[(R_{\tau-1} - 1 - r)u'(y + (R_{\tau-1} - 1 - r)K^{f*})] = 0$$

and the SOC is satisfied. Suppose that the root $K^{f*}$ of this equation is such that one term in its sum is strictly negative: since all expectation terms have the same value because of stationarity, also the sum would necessarily be strictly negative, which contradicts the assumption that such a $K^{f*}$ is the root of that equation. The same impossibility arises in the case of a strictly positive term. Hence, the optimal $K^{f*}$ must be such that

$$E[(R - 1 - r)u'(y + (R - 1 - r)K^{f*})] = 0.$$

This implies that

$$\begin{aligned} K^{f*} &= \arg\max E[u(c)] \\ & s.t. \qquad c = y + (R - 1 - r)K^f. \end{aligned}$$

This problem can be transformed into a familiar one by means of two changes of variables. First, introduce a new variable $\omega \equiv y/(1+r)$ and, second, express the per-capita endowment as $K^f = \alpha\omega$, so that $\alpha$ becomes the new control variable of the planner. Substituting out $y$ and $K^f$ for $\omega$ from the constraint above yields

$$c = [1 + (1 - \alpha)r + \alpha(R - 1)]\,\omega.$$

Choosing $\alpha$ to maximize $E[u(c)]$ subject to this budget constraint is thus formally equivalent to selecting the optimal share of some initial wealth $\omega$ that an agent should invest in the risky asset. This problem can be solved if one assumes that the utility function is given by a CRRA specification and the rate of return of the risky asset, $R - 1$, is lognormally distributed (see e.g. Campbell, 2018). The optimal $\alpha$ is then given by:

$$\alpha^* = \frac{E[R] - 1 - r}{\rho\sigma^2}, \tag{10}$$

where $\rho$ is the coefficient of relative risk aversion and $\sigma$ is the standard deviation of the log of stock returns. The solution of the original problem is thus given by

$$K^{f*} = \frac{\alpha^* y}{1 + r}, \tag{11}$$

and the optimal size of the SWF as a percentage of GDP is

$$s^* = \frac{K^{f*}}{\overline{GDP}}, \tag{12}$$

where $\overline{GDP}$ denotes per-capita GDP. Let $\psi$ denote the ratio of the income of a worker to average income and let $\gamma$ denote the ratio of national income to GDP. Using these definitions and inserting (11) into (12) yields

$$s^* = \frac{\psi\gamma\alpha^*}{1+r}, \tag{13}$$

which, along with (10), gives a closed-form solution for the optimal size of the SWF as a share of GDP.

Representative findings from the literature are $\rho = 1.5$ and $\sigma = 0.2$. Assume further that $E[R] = 1.07$ and $r = 0.01$. The ratio $\gamma$ of national income to GDP is usually in a range between 3/4 and 4/5. The range of $\psi$ that a social planner may consider could be between 1/2 and 2/3. Using these values, it turns out that $s^*$ is in a range between 37% and 53%. Posit $s* = 1/2$; then, on average, three percentage points of GDP can be spent on the social dividend. For a country like Germany, this would imply a social dividend of about 1,500 euros per person and year. Computations based on the German SOEP indicate that the poverty rate in Germany would be reduced by about a third.

# 4 Extensions

## 4.1 Wage risk

Suppose now that workers face a wage risk that cannot be fully insured against - neither through market transactions, nor through welfare-state arrangements and family ties (Chiu and Eeckhoudt, 2010; Wang and Gong, 2013). Then, differently from the basic model, the risk-taking that comes along with the creation of the SWF has a first-order effect on workers' expected utilities. If the wage is positively correlated with the return on the risky asset, the income risk of workers increases. If this effect outweighs the increase in expected income triggered by the SWF, workers' welfare is lowered by the creation of

the SWF. If instead the wage is negatively correlated with the return on the risky asset, the SWF generates an additional insurance effect, and the positive effect on welfare from the creation of the SWF is strengthened.

Empirical studies for the US find that the low-frequency variation in the equity risk premium over time has been countercyclical (Mehra and Prescott, 2008; Bayer and Juessen, 2012). However, the earnings at the top percentile of the distribution tend to be positively correlated with stocks returns (Mankiw und Zeldes, 1991; Constantinides und Ghosh, 2017; Guvenen et al., 2017b, online appendix). But these households at the top of the distribution are likely to correspond to the savers in my model; hence, they can offset the risk taken up by the SWF through a suitable adjustment of their portfolios in the Ricardian way.

In practice, a progressive SWF could invest in an internationally diversified portfolio that takes the domestic wage risk into account. The SWF would favor investment in countries and sectors whose stocks returns are negatively correlated with the domestic wage income, so as to increase the positive welfare effect from its investment.

## 4.2 Endogenous interest rate

In the baseline model of Section 3, the government has no debt in the status-quo. Suppose now that its status-quo level of debt is $G > 0$ and that in the stationary equilibrium the debt is rolled over so that in every period interest-rate payments $rG$ must be covered by the government. Using obvious notation, the government's per-period budget constraint reads,

$$m\left(\frac{t_1+t_2}{2}\right)+(1-m)\left(\frac{T_1+T_2}{2}\right)=rG, \tag{14}$$

with tax revenue on its LHS. This extension is immaterial for the evaluation of the SWF because its financial costs, $rD$, were already taken into account by the determination of the social dividend, see Eq. (4), and the interest rate was pinned down by the productivity

of the safe technology.

Suppose now that, in addition to having some pre-existing public debt $G$, the interest rate is endogenously determined in the bonds market - thus, no firm adopts the safe technology in the status-quo. The market for government bonds clears if

$$\left(\frac{1-m}{2}\right) B = G + D, \tag{15}$$

where bonds demand on the LHS implicitly depends on the interest rate through $B$. In this case, as shown by (14), creating the SWF ($K^f = D = dK^f > 0$) may generate a fiscal externality because of its impact on the equilibrium interest rate.

Since young savers' income is on average increased by the SWF, this income effect tends to increase their demand for bonds; hence, the sign of the effect from creating the SWF on $r$ cannot be determined a priori. I now posit the plausible scenario in which the SWF causes a rise in the interest rate. In this case, the SWF generates a negative pecuniary externality for the government and a positive one for the savers.

Since it creates a need for additional tax revenue, a rise of the interest rate threatens to kill the Pareto-improvement result. As I am going to show, creating the SWF still leads to a Pareto improvement if the additional public expenditures for interest-rate payments on the pre-existing debt are entirely financed through an increase of $T_2$, the tax paid by the savers when they are old. Since their only primary income in period 2 is capital income, $T_2$ may be interpreted as a capital tax.

Intuitively, the proposed increase of $T_2$ implies that the savers can afford the same consumption that they could afford, had the interest rate stayed constant; so they cannot be made worse-off by the SWF. Formally, the required tax increase amounts to,

$$dT_2 = \left(\frac{2G}{1-m}\right) dr > 0. \tag{16}$$

At $K^f = D = dK^f = 0$, the market-clearing condition (15) implies $G = (1-m)B/2$, and

so,

$$dT_2|_{K^f=0} = Bdr, \tag{17}$$

which implies

$$dC_2|_{K^f=0} = (Bdr - dT_2)|_{K^f=0} = 0.$$

This tax increase cancels out the externality, while the savers retain the positive welfare effect due to the efficiency gain from undertaking risk in the first part of their life cycle - as shown in the previous section. The welfare-enhancing effect from the SWF for the workers remains intact. However, an increase of the equilibrium interest rate decreases the optimal size of the SWF, see Eq. (13).

### 4.3 Endogenous stocks prices

With concave technologies and assets that last more than one period, several additional extensions become possible. For the sake of brevity, I refer the reader to the analysis in Diamond und Geanakoplos (2003) which in essence confirms the main conclusion of the baseline model. However, two insights deserve explicit mentioning. First, if the marginal return of the risky technology is strictly decreasing and stocks returns thus decrease, this will reduce the optimal size of the SWF, see Eq. (13). Second, if assets last many, possibly infinite, periods, intergenerational effects will arise through changes in asset prices. For instance, the investment in stocks by the SWF may increase the market value of stocks. In this case, the generation of savers that is old when the SWF is created benefits through this channel whereas all future savers have to pay higher stocks prices. In order to cancel out this externality, the government can introduce a tax on capital gains and use the proceeds to finance a cut of $T_1$, the tax on savers' earnings when young. Notice however that, as pointed out by Diamond und Geanakoplos (2003), the value of the stock market

needs not rise if creating the SWF at the same time increases the interest rate through the channel examined in the previous section.

### 4.4 Intergenerational risk sharing

Hitherto I have assumed a closed economy that has to bear whatever aggregate risk is implied by the existing technology. In this case, it is impossible to reduce the income risk generated by the SWF. A small open economy that does not affect world market prices could instead do better than in the baseline model by using the international financial policy of the government to intertemporally smooth the payment of social dividends to its citizens. E.g., in times of supernormal returns these could be used by the government to buy back the country's public debt on the world financial market and build a financial reserve that would be used to ensure that a stable social dividend is paid in times of subnormal returns. A similar policy has indeed been followed during the last decades by the only existing SWF that pays out a social dividend: the one in Alaska. In particualr, the Alaska's Permanent Fund Dividend is computed as an average return of the fund over the last five years; see e.g. Goldsmith (2012).

## 5 Institutional aspects

Progressive SWFs should be democratically legitimate independent agencies - institutional cousins of those central banks, competition authorities, and regulatory bodies to which many polities have assigned the task of tackling some complex problem in view of a broadly supported long-run goal (Tucker, 2018). Existing SWFs are often embedded in an institutional framework known as the "manager model" (Al-Hassan et al., 2013; Bernstein, et al., 2013; Clark et al., 2013). The legal owner of the assets constituting the SWF is the government, usually the ministry of finance. In turn, the owner gives an investment mandate to an asset manager, typically the central bank or a separate fund

management entity owned by the government. Some additional governance requirements are likely to be necessary in order to ensure an efficient management of public wealth through progressive SWFs. First, the SWF should be explicitly assigned a purely financial objective, namely the long-run maximization of the risk-adjusted return on the invested capital. As explained later, this does not imply that non-pecuniary goals be neglected, but it is necessary for accountability. Second, the SWF should be professionally managed and be shielded from interference by the government by means of effective legal norms of political independence. As an example, the norms that guarantee the independence of the Bundesbank in Germany have proven to serve this purpose well over several decades. Third, preventive measures should be taken to minimize the danger of capture by large firms and the financial industry, as they could benefit from manipulating the investment decisions of the SWF. This suggests that the core personnel of the SWF should be staffed by civil servants and strict rules limit the extent of revolving doors. Depending on country-specific conditions, it might be recommendable to put a relatively low cap – possibly zero - to the investment of the SWF in domestic firms.

The social dividend need not be paid out every month or every quarter: it could alternatively be reinvested in personal accounts of the citizens at the SWF that they could use to finance sabbatical years during the middle part of their life cycle and an annuity in old age. The former would contribute to meet a secular rise in people's demand for more personal autonomy and the latter would help to avoid old-age poverty.

Upon reaching adulthood, every citizen could be granted the option to open at any time a *sabbatical account*, entailing the commitment to let her social dividend accumulate in such an account for a fixed number of years, say seven. During that period, her regular social dividends are reinvested in the SWF instead of being paid out, and the resulting returns are exempted from taxation. At the end of the seven-year period, the holder of the account would receive the capitalized social dividends, a sum that would suffice to finance a sabbatical year. This could be spent volunteering in the social economy, engaging in

politics, and pursuing lifelong learning. Those activities would thus become ordinary events in most people's lives and generate far-reaching positive externalities. Employees of large and medium-sized firms would be entitled to unpaid leaves for sabbaticals in order to conduct those activities.

Starting at a later age, say forty, every citizen may choose to reinvest her social dividend in an *old-age-provision account*, instead of a sabbatical account. The SWF could offer accounts with different lock-in periods, e.g. between twenty and thirty years. Countries fighting against old-age poverty could decide to make such old-age-provision accounts compulsory. At the end of the stipulated period, the accumulated amount would be transformed into a life annuity, which the citizen would then receive along with her regular social dividend. In combination, they would drastically reduce the risk of old-age poverty. As it is not linked to one's employment and payment of social security contributions, this method of providing retirement income would not suffer from limited coverage but be available to everyone.

A progressive SWF fund should be a faithful expression of the aspirations of the citizenry. Those aspirations are not limited to increasing one's purchasing power but mirror deep concerns about the quality of human relationships in society and of man's relationship to nature. This broader view of the common good could be acknowledged by subjecting the fund's investment decisions to *ethical requirements*. Norway shows a way how to do it. In the wake of an extensive social debate, the Norwegian government released ethical guidelines for the investment of its SWF that were endorsed by the Norwegian parliament. Then, the ministry of finance appointed an independent 5-member Council of Ethics in charge of making recommendations about the exclusion of individual companies from the universe of potential stocks available for fund investment, based on those guidelines. The criteria for exclusion include the production of nuclear weapons and cluster munitions, violations of human rights, and severe environmental damage. The list of the excluded companies and of those that have been put under observation is available

online from the homepage of Norges Bank, the asset manager of the fund.[8]

One should expect ethical investment to come with a cost in terms of returns, although this cost is likely to be negligible if the universe of investable stocks is large enough. To economists, the existence of such a trade-off is obvious; formulating ethical requirements for a SWF that pays out a social dividend would make it transparent for everybody. Such an ethical SWF is thus likely to come with recurring debates on endorsed values and broader social goals. This could counteract political apathy and strengthen feelings of communality.

In the case of large and medium-sized countries or groups of countries, such an ethical SWF would not merely be the expression of a collective identity. Because of its size, it would be a prominent financial investor. Hence, its ethical criteria would have an impact on share prices, and thus on the behavior of publicly quoted corporations - that would have an incentive to pay more attention to peace, environmental sustainability and human rights as evoked in the ethical code of the fund.[9]

Finally, a progressive SWF could be helpful as a deterrent against cartel-like behavior in oligopolies, as prompted by the recent surge of mega asset managers like BlackRock, Vanguard, State Street and Fidelity. In several industries such institutional investors own significant shares of all major companies, a pattern known as "common ownership" in the IO literature (Vives, 2020). Common ownership may substantially relax market competition and make it easier for the companies of the asset managers to coordinate their lobbying efforts towards regulators and the media. Such a concentration of power may be diluted by a large SWF that has acquired ownership stakes in the concerned industry. In case of a serious suspicion of socially detrimental collusion, the SWF could decide to

[8] In the case of Norway, Norges Bank makes the final decision about the exclusion of companies. I'd rather suggest that the asset manager should not be charged with the task of solving ethical dilemmas on behalf of the polity. The SWF is to be managed by professionals who maximize its risk-adjusted return subject to a set of investable stocks. In turn, this set could be determined by a democratically appointed council.

[9] See Heinkel et al. (2001) for a related model of green investment and Hong and Kacperczky (2009) and Al Ayoubi and Enjolras (2021) for related empirical evidence.

invest in one or several competing firms in the same industry, with the aim of eventually breaking the cartel. This would be similar to the role played by public firms in models of mixed oligopoly (Corneo and Jeanne, 1994; Bárcen-Ruiz and Garzón, 2020).

# 6 Coda: a comparison with popular capitalism

After World War II, an increasing share of the workforce has engaged in saving and portfolio management, thus performing a function that once was the prerogative of the capitalist class. Thanks to the intermediation of pension funds, many workers have begun investing in the stock market. These developments may suggest the possibility of a future society in which every single worker acts as a small capitalist. Provided that every worker saves enough and invests her savings in a portfolio with a high mean return, the composition of workers' incomes would shift from labor to capital, thus reducing the social and political risks of a falling apart of haves and have-nots. This is, in a nutshell, the idea of popular capitalism that was cherished by e.g. Margareth Thatcher. It finds supporters not only in conservative circles but also in some liberal ones, in which people prefer to use the term "property-owning democracy".

As documented by the empirical literature surveyed in section 2, participation in the stock market and other risky asset markets remains limited despite the introduction of successful innovations like mutual fund shares, ETF, online trading and fintech applications. Thus, if popular capitalism is attainable in the foreseeable future, this is something governments must encourage by means of suitable policies. The scope for increasing stock market participation through pension funds is limited by the nature of today's labor markets. The increased incidence of short-term labor contracts, self-employment, and fragmented earning biographies implies that broad segments of the workforce cannot meaningfully access the stock market through a pension fund and must rely upon individual initiative. This can be encouraged by means of three types of policies: tax incentives, financial education, and a basic capital.

The main tax incentive to encourage private wealth formation by workers is the *subsidization of private retirement plans*. Clearly, this policy is not recommendable if workers are rational forward-looking agents. The redistribution from the individuals who finance the subsidy with their taxes to those who receive it would come along with various losses of allocative efficiency: such a subsidization distorts the relative price of consumption at different dates, it distorts portfolios towards subsidized assets, it causes deadweight losses from the increased taxation that is necessary to finance it, and it consumes resources in order to advertise and explain the retirement plans to customers, to manage their accounts, and in order to administer the subsidies and to fight fiscal fraud. Thus, a necessary condition for this policy to make economic sense is that some individuals save too little in terms of their own long-term well-being. Some empirical evidence suggests that this condition is often met. However, in order for that policy to be recommendable, precisely these irrational individuals should choose to participate in subsidized programs, while rational individuals should voluntarily abstain from them. This is not what happens when subsidized retirement plans are offered. Optimizers, who are likely to be overrepresented among the high-skilled, tend to participate in such programs, whereas those with behavioral problems, who are overrepresented among the low-skilled, tend to abstain from them. E.g., Burman et al. (2004) find that in the US about 41 % of the households in the top quintile of the income distribution self-select into subsidized retirement saving programs while only 3 % of the households in the bottom quintile do. A similar pattern exists in Germany and contributes to explain why the top quintile receives a strongly over-proportional share of the subsidies while the bottom quintile hardly benefits from this policy (Corneo et al., 2018). Making participation in saving plans compulsory would overcome the non-participation problem, but also create new ones. In particular, it would harm those working poor who rationally consume their entire income and would have no access to credit in order to finance mandatory contributions to saving plans.[10]

[10]This is compounded by an incidence problem, i.e. the subsidies being partially or totally shifted to the suppliers of private retirement plans through higher participation and management fees.

The second instrument that is often proposed to bring about popular capitalism is *mass financial education*. In order to avoid the same self-selection problem as the one faced by subsidized saving programs, financial education should be mandatory, e.g. in form of compulsory classes on saving and portfolio management, starting in elementary school. Pupils would be made aware of the benefits from saving, familiarized with the world of financial markets and intermediaries, and introduced to the basic concepts of consumption smoothing and portfolio diversification. Over time, this would increase the average degree of financial knowledge in the adult population and induce people to make wise saving and portfolio decisions.

Apart from the substantial economic costs of programs of mass financial education (Willis, 2011), various empirical studies cast some doubts on their efficacy. Christelis et al. (2010), Grinblatt et al. (2011), Agarwal and Mazumder (2013), and von Gaudecker (2015) find that the binding hurdle for the problem at hand is not financial knowledge but cognitive, especially mathematical, skills. E.g., the latter author writes: "That the factor measuring financial-numerical skill turns out to be much more important than financial knowledge suggests that increasing the latter would not do much for portfolio outcomes." (p.503). Financial education could even backfire by making people excessively self-confident and prompting them to invest in a few badly chosen risky assets.

A third lever to bring about popular capitalism is to have the government transferring a *basic capital* to every individual that enters adulthood. If this amount were large enough, then everyone would have the chance of becoming a rich capitalist. Since financing such a basic capital requires a tax hike, this policy is mainly advocated by the liberal supporters of the idea of a property-owning democracy. Ackerman and Alstott (2000) proposed an amount of $80,000 for a basic capital in the US; given the strong rise of college tuition fees and house prices, maybe as much as twice that amount could be envisaged today. Depending on its generosity, a basic capital would cost two to five points of GDP to the public purse every year. Since a basic capital may be viewed as a universal inheritance, it

would be natural to finance it by an inheritance tax. This would however be insufficient to finance the more generous versions of basic capital so that further tax revenue would have to be raised, e.g. by means of a wealth tax (Piketty, 2020).

Arguably, some combination of tax incentives, financial education, and basic capital could install a form of property-owning democracy in which most individuals would behave like small capitalists, i.e. would receive a significant share of their incomes in form of capital income. So, I am not going to argue that the blueprint of popular capitalism is irremediably utopian, although in some countries it may well be so. Rather, I am giong to argue that for most people its underlying vision of future society is not desirable.

The proposal of popular capitalism is informed by a distinctive *Weltanschauung*, one that views individuals' choices in markets, especially in financial markets, as the centerpiece of human freedom and one that makes individual economic responsibility the touchstone of virtue. This is a highly one-sided assessment. I will briefly criticize it by raising two issues concerning, respectively, time and values.

Technological progress will likely continue to raise productivity and robots will dramatically reduce the relative scarcity of human labor. But the scarcity of *time*, that is entailed by the biological conditions of human life, is bound to persist and hence to be felt ever more sharply. And human life is too short to be spent running after the stock market. That is why most people neither want to become small capitalists nor wish that for their children. Most people complain that they do not have enough time to spend with their beloved ones; they never complain that they would like to spend more time reading the financial pages of newspapers. But most people would not object to a public institution that does that tedious job for them: a SWF that undertakes and manages financial risk on behalf of the citizenry.

Human existence is finite and its time is precious. That is why not only the goal, but also the means of popular capitalism are undesirable. Already nowadays citizens spend a lot of time and attention dealing with the bureacratic burden created by subsidized

saving plans and various taxes. A property-owning democracy would steal even more time from people's lives by imposing mass financial education. Furthermore, financing a basic capital would almost certainly require to lower the exemption thresholds for the inheritance tax; and because of increasing longevity, it would also require an intense monitoring of inter-vivos gifts, that tend to substitute for bequests. Both measures will cost people a significant share of their scarce time and personal energies to deal with various tax bureaucracies. And matters will be even worse if a comprehensive wealth tax is introduced to finance a generous version of the basic capital. So, one reason why a property-owning democracy of small capitalists fails to be the blueprint of a desirable society is that a good society leaves citizens masters of their lifetime to the largest possible extent.

A second fundamental reason for criticism concerns the *values* that are fostered by popular capitalism. Today, only a minority of the population plays the capitalist game, but in popular capitalism all would play it. The winners in the capitalist game are those who accumulate more wealth; thus, merit in a society of capitalists is to rank higher than the other capitalists in the wealth distribution. Already today this criterion of judgment has trickled down to a varying extent to the non-capitalists, i.e. the bulk of the population. Which gives an aura of greatness to the super-rich, fosters consumerism in the populace, and creates a deep frustration in those poor guys who financially fail, without own fault, and then look for scapegoats in some other group, e.g. migrants, women, or Jews. Quite on the contrary, the progressive SWF I propose would trivialize the capitalist game and undermine its symbolic fascination: no reason to revere any "new masters of the universe" if a humble public institution that resembles social security emulates their deeds.

I do not think that freedom and happiness are mainly to be found in market activities and economic competition. Rather, human flourishing is mainly to be found in "relational goods" (Gui, 2005) and "useless knowledge" (Russell, 1996). And one merely has to watch a good movie about Wall Street to get an idea about the quality of relational goods and

the kind of useless knowledge that characterize people who live immersed in a capitalist environment. Popular capitalism would tend to make those mentality standards the general ones.

If economic institutions have an effect on values, they should rather de-emphasize material possessions and human relations based on power. As Bertrand Russell put it, "Good nature is, of all moral qualities, the one that the world needs most, and good nature is the result of ease and security, not of a life of arduous struggle." (1996, p.25)

## References


Acemoglu, D. und P. Restrepo (2020), Robots and jobs: Evidence from US labor markets, *Journal of Political Economy* 128, 2188-2244.

Agarwal, S. und B. Mazumder (2013), Cognitive abilities and household financial decision making, *American Economic Journal: Applied Economics* 5, 193-207.

Al Ayoubi, K. and G. Enjolras (2021), How Norway's sovereign wealth fund negative screening affects firms' value and behaviour, *Business Ethics* 30, 19-37.

Al-Hassan, A., M. Papaioannou, M. Skancke und C.C. Sung (2013), Sovereign wealth funds: Aspects of governance structures and investment management, *IMF Working Paper* 13/231.

Alstadsaeter, A., Johannesen, N. and G. Zucman (2019), Tax evasion and inequality, *American Economic Review* 109, 2073-2103.

Andersen, S. und K. Nielsen (2011), Participation constraints in the stock market: Evidence from unexpected inheritance due to sudden death, *Review of Financial Studies* 24, 1667-1697.

Atkinson, A. (2015), *Inequality*, Cambridge, Harvard University Press.

Autor, D., Dorn, D., Katz, L., Patterson, C. and J. Van Reenen (2020), The fall of the labor share and the rise of superstar firms, *Quarterly Journal of Economics* 135, 645-709.

Bach, L., L. Calvet und L. Sodini (2020), Rich pickings? Risk, return, and skills in the portfolios of the wealthy, *American Economic Review* 110, 2703-47.

Barber, B., X. Huang, T. Odean and C. Schwarz (2022), Attention-induced trading and returns: Evidence from Robinhood users, *Journal of Finance*, forthcoming.

Barberis, N. and M. Huang (2001), Mental accounting, loss aversion, and individual stock returns, *Journal of Finance* 56, 1247-1292.

Barberis, N., Huang, M. and T. Santos (2006), Prospect theory and asset prices, *Quarterly Journal of Economics* 116, 1-53.

Bárcena-Ruiz, J.C. and M.B., Garzón (2020), Partial privatization in an international mixed oligopoly under product differentiation, *Journal of Economics* 131, 77-100.

Barkai, S. (2020), Declining labor and capital shares, *Journal of Finance* 75, 2421-63.

Barro, R. (1974), Are government bonds net wealth?, *Journal of Political Economy* 82, 1095-1118.

Bayer, C. und F. Juessen (2012), The life-cycle and the business-cycle of wage risk - cross-country comparisons, *Economics Letters* 117, 831-833.

Benhabib, J., Bisin, A. and S. Zhu (2011), The distribution of wealth and fiscal policy in economies with finitely lived agents, *Econometrica* 79, 123-157.

Berg, A., E. Buffie und L.-F. Zanna (2018), Robots, growth, and inequality: Should we fear the robot revolution? (The correct answer is Yes), *Journal of Monetary Economics* 97, 117-148.

Bernstein, S., J. Lerner und A. Shoar (2013), The investment strategies of sovereign wealth funds, *Journal of Economic Perspectives* 27, 219-238.

Bhamra, H. and R. Uppal (2019), Does household finance matter? Small financial errors with large social costs, *American Economic Review* 109, 1116-54.

Bönke, T., G. Corneo und H. Lüthen (2015), Lifetime earnings inequality in Germany, *Journal of Labor Economics* 33, 171-208.

Burman, L., Gale, W., Hall, M. and P. Orszag (2004), Distributional effects of defined contribution plans and individual retirement arrangements, *National Tax Journal* 57, 671-701.

Calvet, L., J. Campbell und P. Sodini (2007), Down or out: Assessing the welfare costs of household investment mistakes, *Journal of Political Economy* 115, 707-747.

Campbell, J. (2006), Household finance, *Journal of Finance* 61, 1553-1604.

Campbell, J. (2018), *Financial Decisions and Markets*, Princeton: Princeton University Press.

Chetty, R., J. Friedman, S. Leth-Petersen, T. Nielsen und T. Olsen (2014), Active vs. passive decisions and crowd-out in retirement savings accounts: Evidence from Denmark, *Quarterly Journal of Economics* 129, 1141-1219.

Chiu, W.H. and L. Eeckhoudt (2010), The effects of stochastic wages and non-labor income on labor supply: Update and extensions, *Journal of Economics* 100, 69-83.

Christelis, D., Jappelli, T. and M. Padula (2010), Cognitive abilities and portfolio choice, *European Economic Review* 54, 18-38.

Clark, G., A. Dixon und A. Monk (2013), *Sovereign Wealth Funds: Legitimacy, Governance and Global Power*, Princeton, Princeton University Press.

Constantinides, G. und A. Ghosh (2017), Asset pricing with countercyclical household consumption risk, *Journal of Finance* 72, 415-459.

Corneo, G. (1995), Social custom, management opposition, and trade union membership, *European Economic Review* 39, 275-292.

Corneo, G. (2018a), Public Stock Ownership, *Annals of Public and Cooperative Economics* 89, 11-24.

Corneo, G. (2018b), Ein Staatsfonds, der eine soziale Dividende finanziert, *Perspektiven der Wirtschaftspolitik* 19, 94-109.

Corneo, G. and O. Jeanne (1994), Oligopole mixte dans un marché commun, *Annales d'Economie et de Statistique* 33, 73-90.

Corneo, G., König, J. and C. Schröder (2018), Distributional effects of subsidizing retirement savings accounts: Evidence from Germany, *Finanzarchiv / Public Finance Analysis* 74, 415-445.

DAI (2016), Aktionärszahlen des Deutschen Aktieninstituts 2015, Frankfurt.

Daly, K. (2016), A secular increase in the equity risk premium, *International Finance* 19, 179-200.

Dao, M., Das, M., Koczan, Z. and W. Lian (2017), Why is labor receiving a smaller share of global income? Theory and empirical evidence, IMF Working Paper 17/169.

Das, S., C. Kuhnen und S. Nagel (2020), Socioeconomic status and macroeconomic expectations, *Review of Financial Studies* 33, 395-432.

Dauth, W., Findeisen, S., Suedekum, J. and N. Woessner (2017), German robots - The impact of industrial robots on workers, mimeo, University of Würzburg.

Deutsche Bundesbank (2016), Household wealth and finances in Germany: Results of the 2014 survey, *Deutsche Bundesbank Monthly Report*, March.

Diamond, P. und J. Geanakoplos (2003), Social security investment in equities, *American Economic Review* 93, 1047-1074.

Dimmock, S., Kouwenberg, R., Mitchell, O. and K. Peijnenburg (2014), Ambiguity aversion and household portfolio choice puzzles: Empirical evidence, Netspar DP N° 09/2012-035.

Duarte, F. and C. Rosa (2015), The equity risk premium: A review of models, *Economic Policy Review* 2, 39-57.

Fagereng, A., L. Guiso, D. Malacrino und L. Pistaferri (2020), Heterogeneity and persistence in returns to wealth, *Econometrica* 88, 115-170.

Farmer, R., Nourry, C. and A. Venditti (2012), The inefficient market hypothesis: Why financial markets do not work well in the real world, NBER wp 18647.

Fuest, C., Peichl, A. and S. Siegloch (2018), Do higher corporate taxes reduce wages? Micro evidence from Germany, *American Economic Review* 108, 393–418.

Goerke, L. and M. Pannenberg (2005), Norm-based trade union membership: Evidence for Germany, *German Economic Review* 5, 481-504.

Goldsmith, S. (2012), The economic and social impacts of the Permanent Fund Dividend on Alaska, in: K. Widerquist und M. W. Howard (eds.), *Alaska's Permanent Fund Dividend*, New York, Palgrave Macmillan.

Gomes, F., M. Haliassos, and T. Ramadorai (2021), Household finance, *Journal of Economic Literature* 59, 919-1000.

Gossen, H. (1927), *Entwicklung der Gesetze des menschlichen Verkehrs und der daraus fließenden Regeln für menschliches Handeln*, Berlin: Prager.

Grinblatt, M., M. Keloharju und J. Linnainmaa (2011), IQ and stock market participation, *Journal of Finance* 66, 2121-2164.

Gui, B. (2005), From transactions to encounters: the joint generation of relational goods and conventional values, in Gui, B. and R. Sugden (eds.), *Economics and Social Interaction*, Cambridge, Cambridge University Press.

Guiso, L., P. Sapienza und L. Zingales (2008), Trusting the stock market, *Journal of Finance* 63, 2557-2600.

Guiso, L. and P. Sodini (2013), Household finance: An emerging field, in Constantinides, G., Harris, M. and R. Stulz (eds.), *Handbook of the Economics of Finance Vol.2B*, Amsterdam, North-Holland.

Guvenen, F., Kaplan, G., Song, J. and J. Weidner (2017a), Lifetime incomes in the United States over six decades, NBER wp 23371.

Guvenen, F., S. Schulhofer-Wohl, J. Song und M. Yogo (2017b), Worker betas: Five facts about systematic earnings risk, *American Economic Review* 107, 398-403.

Haliassos, M. und C. Bertaut (1995), Why do so few hold stocks?, *Economic Journal* 105, 1110-1129.

Heinkel, R., Kraus, A. and J. Zechner (2001), The effect of green investment on corporate behavior, *Journal of Financial and Quantitative Analysis* 36, 431-449.

Holmström, B. and J. Tirole (1998), Private and public supply of liquidity, *Journal of Political Economy* 106, 1-40.

Hong, H. and M. Kacperczyk (2009), The price of sin: The effects of social norms on markets, *Journal of Financial Economics* 93, 15-36.

Jappelli, T. und M. Padula (2013), Investment in financial knowledge and saving decisions, *Journal of Banking and Finance* 37, 2779-2792.

Karabarbounis, L. and B. Neiman (2014), The global decline of the labor share, *Quarterly Journal of Economics* 129, 61-103.

Lusardi, A., P.-C. Michaud und O. Mitchell (2017), Optimal financial knowledge and wealth inequality, *Journal of Political Economy* 125, 431-477.

Malkiel, B. (2013), Asset management fees and the growth of finance, *Journal of Economic Perspectives* 27, 97-108.

Mankiw, G. (2000), The savers-spenders theory of fiscal policy, *American Economic Review* 90, 120-125.

Mankiw, G. und S. Zeldes (1991), The consumption of stockholders and nonstockholders, *Journal of Financial Economics* 29, 97-112.

Meade, J. (1984), Full employment, new technologies and the distribution of income, *Journal of Social Policy* 13, 129-146.

Mehra, R. und E. Prescott (2008), The equity risk premium: ABC, in: R. Mehra (ed.), *Handbook of the Equity Risk Premium*, Amsterdam, Elsevier.

Mookherjee, D. and D. Ray (2020), Growth, automation and the long run share of labor, CEPR DP 14286.

Piketty, T. (2020), *Capital and Ideology*, Cambridge, Harvard University Press.

Polkovnichenko, V. (2005), Household portfolio diversification: A case for rank dependent preferences, *Review of Financial Studies* 18, 1467-1502.

Prettner, K. und H. Strulik (2017), The lost race against the machine: Automation, education, and inequality in an R&D-based growth model, CEGE DP 329.

Russell, B. (1996), *In Praise of Idleness and Other Essays*, London, Routledge.

Simon, H. (1976), From substantive to procedural rationality, in *Method and Appraisal in Economics*, Cambridge, Cambridge University Press.

Stiglitz, J. (1988), On the relevance or irrelevance of public financial policy, in Arrow, K. and M. Boskin (eds.), *The Economics of Public Debt*, Houndmills: Macmillan.

Stiglitz, J. (2015), New theoretical perspectives on the distribution of income and wealth among individuals: Part II: Equilibrium wealth distributions, *NBER* Working Paper 21190.

Trabandt, M. and H. Uhlig (2011), The Laffer curve revisited, *Journal of Monetary Economics* 58, 305-327.

Tucker, P. (2018), *Unelected power*, Princeton, Princeton University Press.

Vissing-Jorgensen, A. (2004), Perspectives on behavioral finance: Does "irrationality" disappear with wealth? Evidence from expectations and actions, in: M. Gertler und K. Rogoff (eds.), *NBER Macroeconomics Annual 2003*, Cambridge, MIT Press.

Vives, X. (2020), Common ownership, market power, and innovation, *International Journal of Industrial Organization* 70, 1-12.

vom Lehm, C. (2018), Understanding the decline in the U.S. labor share: Evidence from occupational tasks, *European Economic Review* 108, 191-220.

von Gaudecker, H.-M. (2015), How does household portfolio diversification vary with financial literacy and financial advice?, *Journal of Finance* 70, 489-506.

Walras, L. (1880-1881), Théorie mathématique du prix des terres et de leur rachat par l'état, *Bulletin de la Société Vaudoise des Sciences Naturelles* 17, 1-97.

Wang, J. and P. Gong (2013), Labor supply with stochastic wage rate and non-labor income uncertainty, *Journal of Economics* 109, 41-55.

Wenzel, M. and J. König (2019), Investment losses and inequality, mimeo, FU Berlin.

Willis, L. (2011), The financial education fallacy, *American Economic Review* 101, 429-434.