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Should Germany Pursue a Transition to a Multi-pillar Pension System?

A Simulation Study

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I. Introduction

In general, the structure of pension systems is set up differently in every country. The aspects in which these systems vary across nations include - amongst others - the degree of voluntary participation, the extent of workers' contribution, the amount of pensioner's benefits as well as the retirement age. The way of financing a pension system is regarded as another crucial element for defining such schemes. Thus, this research will examine the best financing method for pension systems. Moreover, the renowned Mercer Global Pension Index verifies the relevancy of pension financing (2019). The Netherlands and Denmark do not only share the second place in Mercer's ranking concerning the best pension system, but are also the two leading countries in terms of pension fund assets to GDP, with ratios of about two hundred percent. In this ranking, Germany takes up the fourteenth place with a pension-assets-to-GDP ratio of only 8.4 percent. Therefore, Mercer's advice for Germany to increase its pension assets does not come as a surprise. In contrast to Germany, the Netherlands and Denmark distinguish themselves by keeping the level of pension fund assets high by implementing a mixed pension system. This approach has been used since the introduction of pension schemes in the 1950s. In this mixed system, a certain fraction of the workers' contributions - which is referred to as the PAYG (Pay-as-you-go) part - goes directly to current pensioners. The remaining amount is integrated into a pension fund, called the funding part. Consequently - based on the fund's performance and outstanding promises - the fund determines how much money to withdraw from the fund and distribute to current pensioners. The remaining part is invested in various types of financial assets. Germany, on the other hand, adopted a full PAYG system in the 1950s. As a result, all the money collected by the workers' contributions is immediately distributed to current pensioners. Starting in the 1990, the World Bank has been advising governments to implement a mixed pension due to the difference in performance of the two aforementioned pension systems. However, not many countries that initially selected the PAYG system, transitioned to a mixed system which is prevalent in, for example, the Netherlands and Denmark. This situation can be explained by two reasons. Firstly, the PAYG system features potentially high levels of implicit debt and workers prefer not to carry a so-called double burden. This implicit debt can be defined as a countries' promise to to pay for the pension benefits of current and future retirees. If a country decides to avoid issuing debt and chooses to transition, the double burden phenomenon arises because current workers are required to not only save for their own pension but also to continue paying for the current retirees' pensions. When attempting to avoid a double burden, part of the implicit debt is converted into explicit debt by issuing bonds. In practise, national governments would need to subsidize pension benefits for current pensioners during the transitioning phase to avoid double burdening its working population. These subsidies composing the new explicit debt were implicit under the full PAYG system. To highlight the significance of the problem: if Germany wants to copy the Dutch or Danish pension system in one go, it would need to raise its Debt-to-GDP ratio by about 200 percent. Thus, for countries stuck in a PAYG system, the World Bank advocates a transition into a mixed system with a dominant PAYG proportion. Generally, it can be observed that Germany remains cautious towards such a transition. Since 2001, all employees are entitled to voluntary occupational pensions and the Riester pensions were introduced. This allows workers to voluntary save for their pension through investing in capital markets. Due to its voluntary character and the existence of already high PAYG contributions, most workers have made little use of these options. Furthermore, the Riester plan is considered a failure by a multitude of German politicians. Therefore, the principal main of this thesis is to explore the question whether a more rigorous transition by introducing mandatory funding contributions while the federal government has to absorb the newly created explicit debt would be beneficial for Germany.

A mixed pension system has several advantages compared to a full PAYG system. The mixed system is less vulnerable to demographic risks. Germany faces an increasing old-age-dependency ratio due to an expected decrease in the amount of workers and - at the same time - an increase in the number of pensioners. If the current German workforce saved a part of its contributions, they would be less dependent on the amount of workers when retiring themselves. Another advantage of a mixed system is that the expected payoff of pension benefits relies less on the growth of the German economy. If the tax base, measured as German GDP, does not grow to its target level, pension benefits will decline as a direct consequence. Thus, the question what factors prevent Germany from pursuing such a transition arises. This can be explained by the fact that the amount of implicit debt which would turn into explicit is a serious issue. Even though the current interest rate on 30 year German bonds - which would need to be issued to subsidize pension benefits during a transitioning phase - is slightly negative, certain risks are associated with this undertaking. Already before the COVID-19 pandemic, by having a debt-to-GDP ratio of 59.6 percent, Germany almost exceeded the allowed maximum which is set as 60 percent by the EU's Stability and Growth pact. Unfortunately, debt is not the only problem associated with a mixed system. For instance, since 2007, several Central and Eastern European countries have experienced difficulties during their transition due to capital markets being highly volatile in comparison to GDP. This circumstances combined with the fact that the expected real rate of return on equity has decreased over time, possibly justifies Germany's reluctance.

My research focuses on the question whether such a transition is worth pursuing for Germany. Therefore, I developed two schemes Germany could follow: a PAYG scheme and a mixed scheme. The PAYG scheme serves as a simplification of the current system. Here, nearly all workers' contributions are directly transferred to current pensioners as benefits. The mixed scheme, later also refereed to as the MIX scheme, acts as the pension system advised by the World Bank. Here, part of the workers' contributions are directly transferred to the retirees, and a substantial remaining part is transferred to the pension fund. Subsequently, the pension fund transfers money to retirees. The government subsidizes the MIX scheme by issuing debt up to 40 percent of Germany's GDP. To account for the different paths that the world capital markets and Germany's GDP may follow, numerous simulations for both schemes are run, where the capital markets and Germany's GDP take different routes. For each individual simulation, the average benefit per pensioner is calculated. Simple statistics such as the mean and standard deviation of the average benefit per pensioner over all simulations do not serve well as means of comparison since the varying risk has to be accounted for. Therefore, the utility derived by the average pension benefit is calculated for each simulation using a time discounted constant relative risk-aversion (CRRA) utility function. To provide a more concrete measure of comparison than the numerical utility, the certainty equivalent level of the average benefits is calculated. This can be defined as the fixed benefit level a pensioner would want to get in all simulations to receive the same expected utility as in the risky schemes.

In Table 2 it is illustrated how the MIX scheme is optimized through multiple parameters consisting of the fraction of funding contributions to total contributions, the maximum Debt-to-GDP ratio increase the government establishes, the fraction of capital the new pension fund should invest in risk bearing assets, and the size of the new pension fund's withdrawals as a function of the fund's Capital-to-GDP ratio. Even though in my analysis a higher debt ratio would lead to a higher expected utility, the Debt-to-GDP ratio has an upper bound of 40 percent. The reason of this limit is to keep the MIX scheme pragmatical as it is arguably unlikely for Germany to, for example, double its national debt ratio to finance the transition. Besides that, the ratio of the pension fund's capital to the amount invested in risky assets is bounded from above by the value one, as usually pension funds are not allowed to go short.
The results of the optimized MIX scheme are compared to the status quo representing the PAYG scheme. The outcomes clearly predict gains which an increase in funding can lead to. For the next 60 years, pension benefits are expected to increase by 6.78 percent on average. Due to the greater variation in pension benefits under the MIX scheme, an 1.85 percent increase in the certainty equivalent level of pension benefits, compared to the PAYG scheme, is expected.

Table 4 presents the outcomes of the sensitivity analysis which was conducted for multiple scenarios by altering certain assumptions. This demonstrates how both schemes perform relatively to each other and to the baseline scenario in different circumstances. As expected, the results largely depend on the capital markets, real wage growth rate and changes in employment. The strategy of the MIX scheme represents the idea to include going long on risk-bearing assets, financed by shorting German bonds, to the pension system. Therefore, this

scheme is harmed by lower returns on risk-bearing assets and higher interest rates on German bonds, but not necessarily by an increase in the risk-free rate. The return of a PAYG scheme is often depicted as the sum of the real growth rate of wage and the growth rate of workers. While both schemes indeed improve by an increase in both real wage and employment growth, the performance of the PAYG scheme progresses relatively more than the MIX scheme. However, during the adverse scenario's described above, the MIX scheme outperforms the PAYG scheme. Furthermore it became clear that as the introduction of more funding leads to greater variation in benefits, risk-averse participants will be less keen to transition. One might wonder whether Germany should increase its debt ratio by 40 percent of GDP to increase the pension benefits over the next 60 years by on average 6.78 percent in expectation, accompanied by more variation in the benefits. Therefore, I recommend Germany to conduct further research regarding this subject matter by using individual accounts where individuals can choose their asset allocation based on their risk aversion and where more is known about the potential problems that arise if Germany wants to issue debt to the extent that their adherence to the rules of the EU's Stability and Growth Pact is jeopardized.