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LONG TERM PASSIVE INVESTMENT STRATEGIES AS A PART OF PENSION SYSTEMS

ABSTRACT. The problematics of long term investing is in the centre of attention of many academicians as well as financial professionals. The population in developed and also in emerging countries is aging and the traditional pension schemes start to experience serious problems. One of the solutions is to establish capitalisation pillars of pension systems. The capitalisation pillars are based on long term investing in stocks, bonds and other securities. Therefore it is important to identify efficient long term investment strategies. This paper compares long term regular investing in conservative instruments of money market (t-bills, deposit accounts, etc.) and indexing (investing in portfolio of stocks that tracks a benchmark stock index) in the USA, Japan and Germany over the 1985-2014 time period. The results show that regular investing leads to the cost averaging effect that proves to eliminate the impacts of market turbulences significantly in the long term. The results also show that indexing is superior to conservative investments in the long term, although in Japan the results were slightly in the favour of conservative investments during the 1985-2014 time period.

Keywords: passive investment strategy, interest rates, cost averaging effect, indexing, share market.

Introduction

The effectiveness of long term investing has been a main topic of various theoretical as well as practical studies. A lot of academicians and financial professionals are supporters of passive investment strategies such as buy & hold or indexing. On the other hand there are some studies that show that there are some active investment strategies based on stock picking or market timing, that are able to record superior results.

Malkiel (2012) and Bogle (2010) came to conclusion that index investing is as effective as active managed funds in the long term. It was proven that on a 16-year time horizon, index funds achieve the same results as actively managed funds. These findings have been supported also by other publications. For example Siegel (2014) analysed the whole history of the U.S. share market and he came to conclusion that passive investment strategies

are efficient despite some market collapses, but a long time horizon is needed. A similar conclusion was reached by Graham (2007, 2008).

Most of the authors support the buy & hold strategy, although many of them claim that it should be supported by the cost averaging effect. The cost averaging effect limits the negative effects of market crashes. The investor buys stocks on a regular basis, regardless the market development. If the stock market collapses, the investor buys stocks at lower prices which results in a lower average purchase cost. Positive results of long term investing using the cost averaging effect were presented also by the study of Edelson (2007).

A detailed analysis of selected long term stock market investment strategies as well as the comparison of passive and active investment strategies was conducted also by other authors. For example Pastor and Stambaugh (2012) focused on the declining effectiveness of actively managed investment funds. French (2008) came to conclusion that “the typical investor would increase his average annual return by 67 basis points over the 1980-2006 period if he switched to a passive market portfolio”. Lye (2012) analysed the differences between growth and value stocks. Cambell, Polk and Vuolteenaho (2010) analysed systematic risks of stock investing.

One of the newest contributions to the discussion was presented by Fabozzi (2015) who analysed the current state of the U.S. Pension Benefit Guaranty Corporation (PBGC). He concluded that some changes in investment strategies of the funds should be made. He also advises that PBGC should introduce a benchmark for pension fund investments.

Some arguments in favour of passive investment strategies were presented by Wingenfeld (2013) who talks about five specific qualitative arguments that are eligible to be a theoretical proponent for passive portfolio management. This topic is in the centre of attention of some of the Chinese economists as well. For example Wang, Beland and Zhang (2014, 2014) warn that there is a pension system missing in China. It could become a huge problem due to the rapidly aging Chinese population.

1. Methodology

In this paper, the effects of long term investing over a 30-year time period are analysed. This time horizon enables inclusion of one of the European share markets into the analysis, as European share indices didn't exist before the 80's. The 30-year time horizon is also a usual time of involvement of an individual in a pension scheme.

The effects of long term saving and investing on the time horizon of the last 30 years are examined. The American S&P 500 stock index is used, as the American stock market is the most liquid one, with a well-documented history. It consists of various share companies across all of the sectors of the U.S. economy. It also reflects the relation between the U.S. share market and the U.S. economy very well. It is very close to the theoretical concept of the optimal portfolio. The long term investing in S&P 500 will be compared to long term investing of risk-free short-term securities. The FED rate was used for this purpose.

Another share market chosen for the analysis is the Japanese share market represented by NIKKEI 225 share index. Europe will be represented by Germany and its benchmark share index DAX 30. Similarly to the U.S. case, there are the main interest rates of the Bank of Japan and the Deutsche Bundesbank (later ECB) used to calculate the returns of the conservative portfolio.

Following hypotheses are tested:

Hypothesis 1: The long term buy & hold investment strategy that uses the cost averaging effect is successful in the long term, despite the major turbulences that hit financial markets from time to time.

Hypothesis 2: Investing in stock funds that track a stock index (i.e. indexing) is more efficient than investing in some conservative securities of the money market.

The analysis is based on following assumptions:

- 1) The investor invests regular amount of 100 USD per month into a pension fund that tracks the share index (S&P 50, Nikkei 225 or DAX 30) or he invests 100 USD per month into a conservative fund with yields equal to the benchmark interest rate in the particular country, plus a premium of 1%.
- 2) Regular investing on the monthly basis leads to a cost averaging effect.
- 3) The stock fund investments (indexing strategy) are made monthly. The calculations are made using the stock index value on the first day of the calendar month. The indexing strategy is based on tracking of a stock index. But it is important to note that indexing has developed significantly during the 90's, as the exchange traded funds (ETFs) were introduced. Today, a lot of pension funds apply the indexing strategy via investments in ETFs. However, ETFs are not able to track the stock market indices perfectly and there exist tracking errors. The tracking error means that the performance of the ETF oscillates around the performance of the underlying stock index and it may record slightly better or slightly worse results compared to the index. Due to the relatively short history of ETFs, we assumed in this article that the managers are able to track the stock indices without tracking errors.
- 4) Following formulas were used:
 - a) *conservative investment – final balance (annuity remuneration)*

$$FV_c = A \cdot \sum_{m=1}^n (1+i)^{n-m} \quad \text{or} \quad FV_c = A \cdot \left[\frac{(1+i)^n - 1}{i} \right]$$

A – annuity payment,

i – interest rate,

n – number of periods,

m – a given period, when the payment is realized.

c) *index investing - final balance*

$$FV_I = \left(\frac{A_1}{P_1} + \frac{A_2}{P_2} + \frac{A_3}{P_3} + \frac{A_4}{P_4} + \dots + \frac{A_n}{P_n} \right) \times P_n \quad \text{or} \quad FV_I = \sum_{i=1}^n \frac{A_i}{P_i} \times P_n$$

P – value of the share index,

n – number of periods,

i – a given period, when the purchase of the share index was realized.

d) *cumulative investment*

$$I = n * A$$

n – number of periods,

A – annuity (a regular investment).

e) *nominal return*

$$R = FV - I$$

f) *cumulative nominal yield*

$$Y = \frac{R}{I}$$

g) *final balance – purchasing power (start of the period money value)*

$$FV_{PP\ 1985} = \frac{FV}{\frac{1 + CI}{100}}$$

CI – cumulative inflation for the period.

- 5) The analysis abstracts from transaction costs related to trading, such as brokerage fees. The fees have been changing over time and there can be significant differences not only between different time periods but also between different countries. Moreover there tend to be significant differences between brokerage fees within one country as well. The fees depend not only on the legislative regulations but also on business policies of brokers or asset management companies. In general, passive managed funds (for example index funds) and money market funds are supposed to be easier to manage, the asset managers have lower costs and they also charge lower fees to their clients. This is why abstracting from transaction costs shouldn't impact the final comparison of indexing and conservative investments nor the evaluation of the hypotheses.
- 6) The analysis abstracts from taxes, as the tax rates changed several times during the analysed period. Moreover the pension investments are tax exempt in most of countries.
- 7) Only approximately 25% of portfolio managers are able to beat the market benchmark. Most of them manage hedge funds that often undergo significant risk. It is very hard for pension funds to beat the benchmark because of various regulations that limit them. Therefore we will assume that the aim of the pension funds is not to beat the benchmark but to reach returns similar to the benchmark.
- 8) The currency used in the analysis is USD. Only one currency is used in order to enable the comparison between individual countries. The assumption is that there is a constant purchasing power parity and the changes in exchange rates are driven by inflation differential solely, so that the results in different countries can be compared more easily.
- 9) The results are evaluated on the nominal as well as on the real basis.
- 10) The whole 30 year time period is evaluated (1985 – 2014) as a whole and also divided by decades (1985 – 1994, 1995 – 2004, 2005 – 2014).

As a result, the long term effectiveness of investing on stock and money markets of three different countries can be compared.

2. Long term conservative investment and indexing – the USA

The first time period (1985 – 1994) was preceded by significant changes on financial markets that were a consequence of the monetary crisis in the 70's. The crisis led to the cancelation of the convertibility of USD for gold and a strong depreciation of USD. The debt crisis in early 80's was related to instability of the financial system that resulted into a strong growth of inflation and interest rates. As a result conservative investments were as successful as stock investing, if not even more (depending on the time period).

Tab. 1. The comparison of conservative investment and indexing – USA

		1985 – 1994	1995 - 2004	2005 - 2014	1985 - 2014
monthly investment		100,00	100,00	100,00	100,00
cumulative investment		12 000,00	12 000,00	12 000,00	36 000,00
final balance	conservative investment	16 772,46	14 943,35	13 156,94	68 348,07
	stock investment	17 957,83	15 642,17	19 081,45	126 199,40
nominal return	conservative investment	4 772,46	2 943,35	1 156,94	32 348,07
	stock investment	5 957,83	3 642,17	7 081,45	90 199,37
cumulative nominal yield	conservative investment	39,77%	24,53%	9,64%	89,86%
	stock investment	49,65%	30,35%	59,01%	250,55%
cumulative inflation for the period		41,94%	26,97%	23,76%	123,04%
final balance – purchasing power (start of the period money value)	conservative investment	11 816,58	11 769,20	10 631,01	30 643,86
	stock investment	12 651,70	12 319,58	15 418,11	56 581,51

Source: own calculations.

The conservative investment yielded 4 772 USD during the first decade. The final sum of the conservative investment was 16 772 USD which means cumulative yield of almost 40%. The index investing resulted in yields of 5 957 USD or nearly 50%. This decade is typical for its high levels of inflation. The cumulative inflation reached up to 42% during the time period from 1985 to 1994. It means that the conservative investment resulted in a negative real return. The real return of the index investing was positive but only marginally.

The second decade (1995 – 2004) was characterized by a boom of stock investing thanks to the arrival of new technologies and the development of so called “internet economy”. The growth of the economy and the stock markets was supported also by the FED that was decreasing its key interest rates. Lower interest rates resulted in an expansion of margin trading. Also the inflation decreased significantly compared to the previous time period. The stock investing was able to outperform the conservative investments significantly in the late 90’s. People who went on pension during those years had secured high rents. But the situation changed dramatically after 2000 when the internet bubble busted. The collapse of the stock markets resulted in huge losses for investors, including the pension funds. The situation is captured by *Figure 1*.

As *Table 1* shows, the final results of conservative investment and indexing were similar also during the second decade. The conservative investment yielded 2 943 USD and the index investment yielded 3 642 USD. Although the cumulative inflation was significantly lower compared to the first decade, the nominal returns were significantly lower as well and therefore the real returns were even worse in the second decade than in the first one. The conservative investment finished with a slightly negative real return again. The index investment had only a miniscule positive real return again.

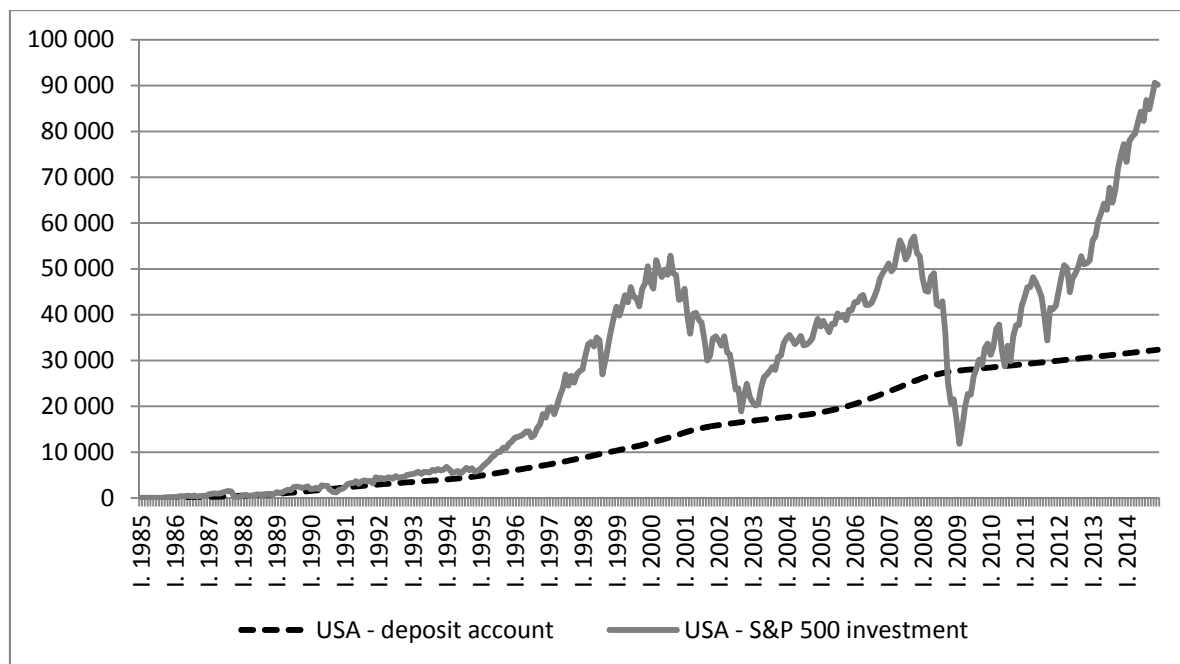


Fig. 1. The nominal return of conservative investment and indexing – The USA
Source: own calculations.

The third decade brought a significant difference between the performance of the conservative investment and indexing, despite the global financial crisis. The main reason is the monetary policy of the FED that has adopted measures such as nearly-zero interest rates policy and quantitative easing very quickly after the full outbreak of the financial crisis. The aim of these policies was to support the real economy and the financial markets. The biggest impact is able to see in the case of the stock markets that started to grow strongly.

The conservative investment yielded only 10% while the index investments yielded more than 59% between 2005 and 2014. The disappointing results of the conservative assets were caused by the policy of extremely low interest rates that lasted for the bigger part of this time period. Despite low levels of inflation, the real yield of conservative portfolio was negative once again. On the other hand index investing recorded a real yield over 28%.

A lot of things happened in the U.S. economy during the whole time period (1985 – 2014). Although there were some major stock market slumps, the analysis shows that the results of indexing were far superior to the results of the conservative portfolio. The conservative investments recorded return of 32 348 USD while indexing led to returns of 90 199 USD. In percentage terms the conservative investment yielded 90% and the stock index yielded slightly over 250%. But the real yields are significantly lower due to the inflation that climbed up to 123%. The real yields of the conservative investment were – 15% and the real yields of the stock investing were 57%.

3. Long term conservative investment and indexing – Japan

Absolutely different results are shown by the comparison of conservative investing and indexing in Japan over the same time period. The 70's and 80's were characterised by very strong economic growth in Japan. As a result investors started to pour their capital into Japan and the Japanese stock market started to grow as well. The bull market resulted into a stock bubble in the early 80's. Also the interest rates were quite high during this time period. The collapse of the stock market bubble resulted in huge losses. This is why the conservative

investments were significantly more successful compared to stock investments during the first time period (1984 – 1995).

The calculations show that conservative portfolio recorded 25% nominal yield while stock portfolio yielded -3,84% due to the collapse of the Japanese stock market. The inflation reached almost 16% during this time period. It means that the real yield of the conservative investment was almost 8% and the real yield of the stock investing was -17%.

Table 2. The comparison of conservative investment and indexing – Japan

		1985 - 1994	1995 - 2004	2005 - 2014	1985 - 2014
monthly investment		100,00	100,00	100,00	100,00
cumulative investment		12 000,00	12 000,00	12 000,00	36 000,00
final balance	conservative investment	14 999,10	12 687,56	12 673,59	45 884,22
	stock investment	11 538,89	9 979,21	18 090,53	43 863,32
nominal return	conservative investment	2 999,10	687,56	673,59	9 884,22
	stock investment	-461,11	-2 020,79	6 090,53	7 863,32
cumulative nominal yield	conservative investment	24,99%	5,73%	5,61%	27,46%
	stock investment	-3,84%	-16,84%	50,75%	21,84%
cumulative inflation for the period		15,77%	-0,59%	3,30%	18,88%
final balance – purchasing power (start of the period money value)	conservative investment	12 955,95	12 762,86	12 268,72	38 597,09
	stock investment	9 967,08	10 038,44	17 512,61	36 897,14

Source: own calculations.

Similar results were achieved also during the second time period (1995 – 2004). The Bank of Japan pushed its key interest rates close to the zero level and it started a quantitative easing in order to avoid deflationary pressures and to kick-start the economy and stock markets. The cheap money policy negatively affected the results of the conservative investment that recorded nominal yield of only 5,73%. On the other hand the efforts of the Japanese central bank and government were insufficient and the bad performance of the stock market continued. The nominal yield of the stock index investing was -16,84%. The cumulative inflation was -0,59% for this time period. The deflation helped to improve the real yields slightly, to 6,36% and -16,35% respectively. The abovementioned development is captured also by *Figure 2*.

A little better results were achieved during the third time period (2005 – 2014). The positive results of the monetary policy started to show up in the form of reflation. The conservative investment yielded 5,61% which is almost identical compared to the previous time period. On the other hand indexing yielded 50,75%. But it is important to note that the positive result of indexing was achieved only due to the very good stock market performance in 2013 and 2014. The real yields were 2,23% and 45,93% respectively.

The analysis of the whole time period shows that the Japanese investor (a potential pensioner) would have better returns from conservative investments. The conservative investments yielded 27,46% while the stock index investments yielded only 21,84%. Although the cumulative inflation was only 18,88%, the inflation adjusted yields are not overly optimistic. The real yields are 7,22% and 2,49% respectively. It means that both

alternatives were merely able to beat the inflation. Another problem is the high level of the Japanese government debt that is over 250% of GDP. The Japanese problems with financing the pension system will grow. Moreover the yields of the conservative investment as well as the stock investment prove to be ineffective for capitalisation pension schemes.

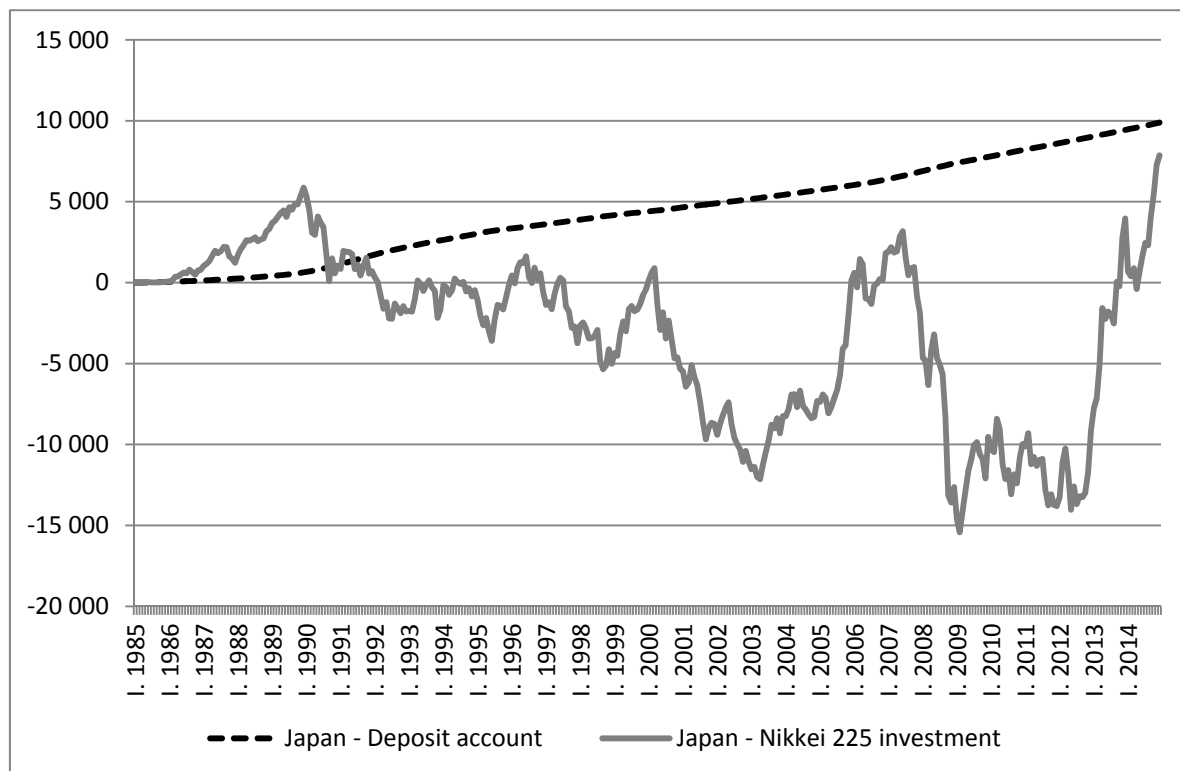


Fig. 2. The nominal return of conservative investment and indexing – Japan
Source: own calculations.

4. Long term conservative investment and indexing – Germany

Germany is an economic leader of the European Union and as the analysis shows (Table 3), the returns from its financial markets are able to beat the U.S. financial market returns on a regular basis.

There were higher interest rates during the first time period (1985 – 1994) therefore the conservative investment yielded 41%. The stock index investing yielded 52%. The success of the German stock market was supported also by a restructuring of the German economy that took place in the first half of the 90's. But the inflation was relatively high, its cumulative value is 27,91%. It means that the real yield of conservative investing was 10,6% and the real yield of indexing was 18,96%.

The cheap money policy and low interest rates resulted in significantly worse results for the conservative strategy in the second time period (1995 – 2004). The nominal yield was only 22,16%. The German stock market experienced a very strong growth in the late 90's followed by a stock market collapse in the early 2000's. As a result the stock investments yielded only 14,33% which is even less than the conservative investment. Inflation decreased approximately by a half, to 15,68%. As a result the real yield of the conservative portfolio was 5,6% and the real yield of indexing was -1,17%.

The third decade (2005 – 2014) was affected by the global financial crisis as well as by the European debt crisis. The European Central Bank cut the interest rates in order to

support the economy. As a result the conservative investment yielded only 12,16% during this decade. The stock market collapsed in 2008 but the crash was followed by a strong bull trend that resulted in 55,62% yields for the indexing strategy. The cumulative inflation was 15,89% during this time period which means that the real yield of conservative investments was – 3,22% and the real yield of indexing was 34,28%.

Table 3. The comparison of conservative investment and indexing – Germany

		1985 - 1994	1995 - 2004	2005 - 2014	1985 - 2014
monthly investment		100,00	100,00	100,00	100,00
cumulative investment		12 000,00	12 000,00	12 000,00	36 000,00
final balance	conservative investment	16 978,08	14 659,70	13 458,81	65 767,81
	stock investment	18 259,06	13 719,27	18 674,92	136 909,00
nominal return	conservative investment	4 978,08	2 659,70	1 458,81	29 767,81
	stock investment	6 259,08	1 719,27	6 674,92	100 909,00
cumulative nominal yield	conservative investment	41,48%	22,16%	12,16%	82,69%
	stock investment	52,16%	14,33%	55,62%	280,30%
cumulative inflation for the period		27,91%	15,68%	15,89%	71,47%
final balance – purchasing power (start of the period money value)	conservative investment	13 273,46	12 672,63	11 613,44	38 355,29
	stock investment	14 274,93	11 859,67	16 114,35	79 844,29

Source: own calculations.

The evaluation of the whole 30-year time period shows, that the stock investments were clearly superior to conservative investments (*Figure 3*). The yield of the conservative portfolio was 82,69% while the yield of the stock portfolio was 280,3%. The cumulative inflation was 71,47%, thence resulting that the real yield of the conservative portfolio was only 6,54% while the real yield of the stock portfolio was 121,79%.

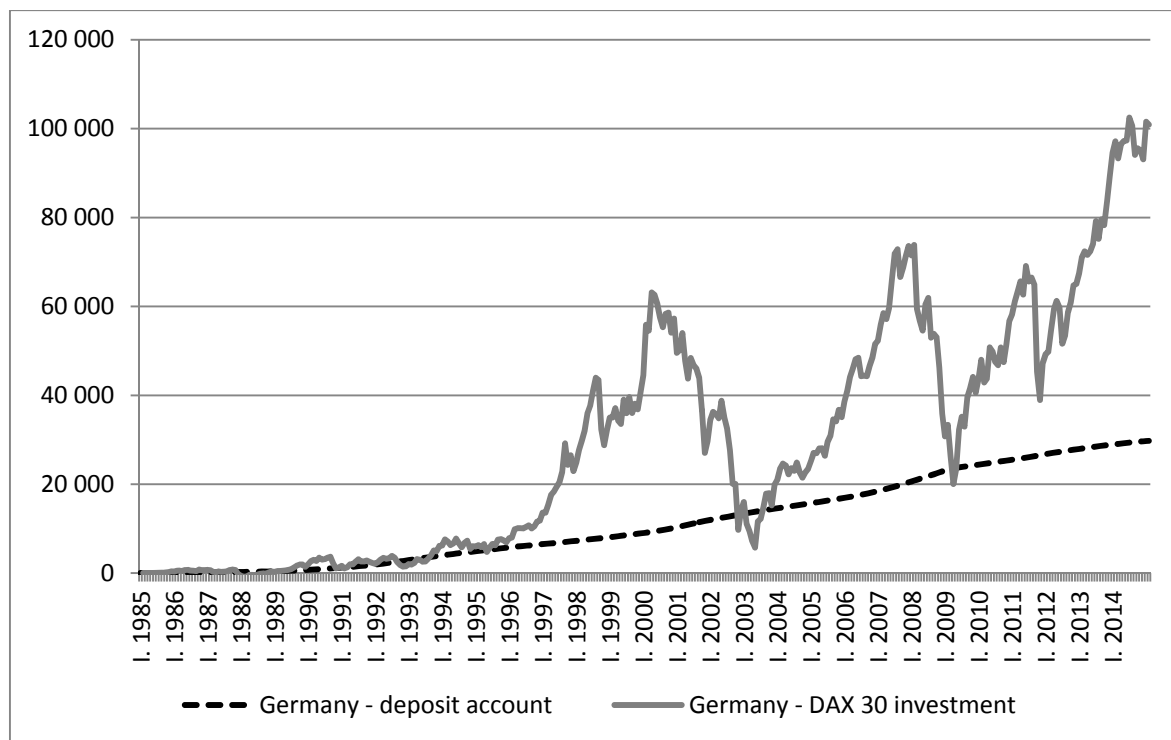


Fig. 3. The nominal return of the conservative investment and indexing – Germany
Source: own calculations.

5. The comparison of results for different countries

Although the financial markets are globalized, we can see significant differences between results of conservative investments and indexing in different countries. Especially the 30-year time horizon fully shows the magnitude of the differences.

The conservative portfolio was the most successful in the USA, where it recorded the biggest nominal returns. The USA was followed by Germany and the conservative portfolio reached the worst results in Japan. The final account balances were 68 348,07 USD in the USA, 65 767,81 in Germany and 45 884,22 in Japan. The results of conservative investments in Japan are poor due to the more than two decades long time period of extremely low interest rates.

Even bigger differences can be seen when comparing results of the stock index investing in particular countries. The best results were achieved in Germany where the final balance reached up to 136 909 USD. The final balance was slightly lower in the USA (126 199,40). By far the worst results were recorded in Japan where the two decades of stock market stagnation resulted in a final balance of only 43 863,32 which is really a very disappointing result (*Figure 4*).

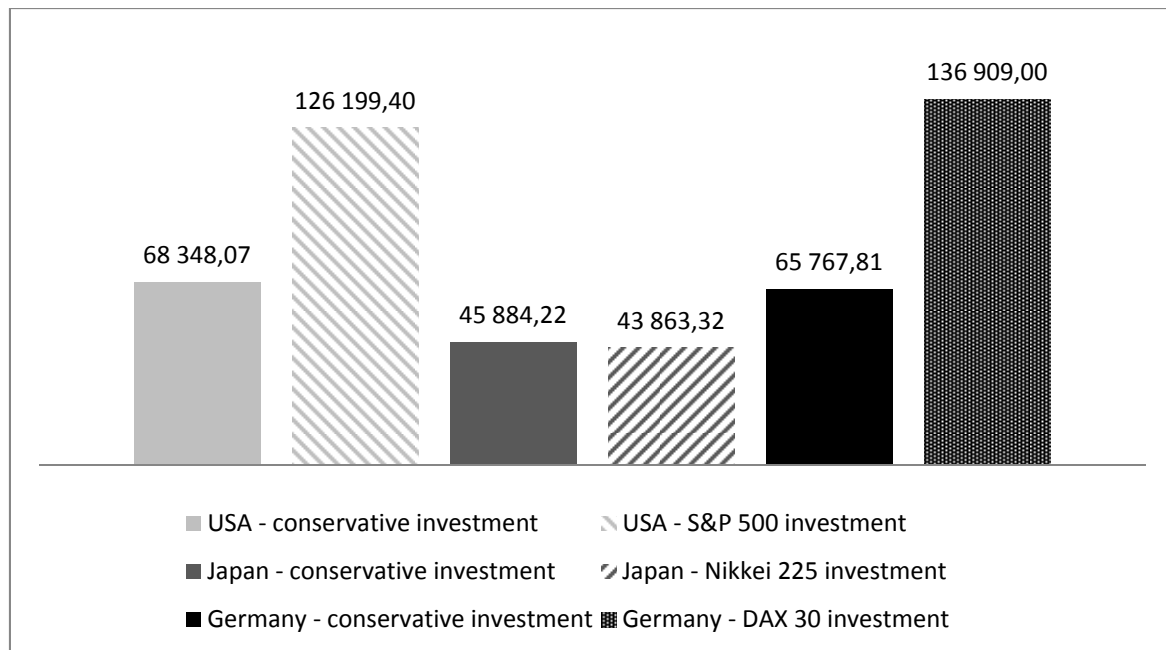


Fig. 4. Final account balances

Source: own calculations.

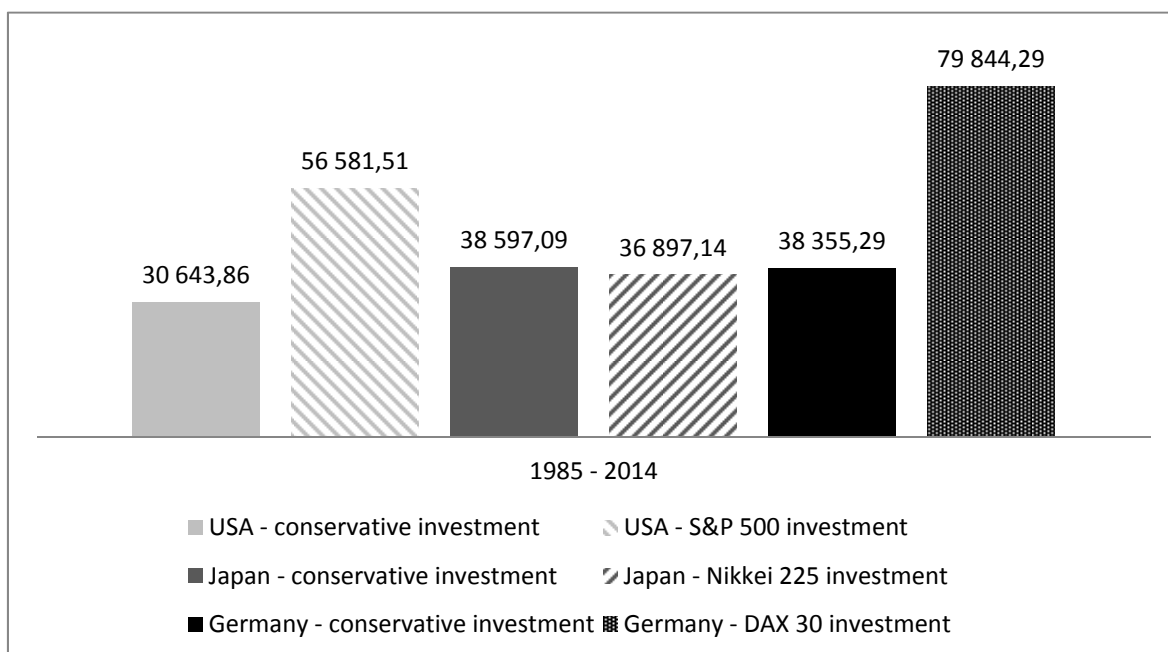


Fig. 5. Inflation adjusted final account balances (purchasing power of 1985 USD)

Source: own calculations.

But the view on the results changes significantly when inflation is taken into account. *Figure 4* shows inflation adjusted final balances. For example the final balance of the U.S. conservative investment is 68 348,07 USD. But 68 348,07 USD in 2014 is worth only 30 643,86 USD from 1985. The cumulative inflation was 123,04% in the USA, 71,47% in Germany and only 18,88% in Japan. It means that although the nominal results were significantly better in the USA and in Germany, the differences are much smaller in the real

values. As a result the results of the conservative investments in Japan and in Germany are comparable and the worst results were achieved by conservative investments in the USA. By far the best results were reached by indexing in Germany where the inflation adjusted final balance grew up to the 80 000 USD level. In the USA it is 56 581 USD and in Japan it is only 36 897 USD.

Conclusion

The analysis shows that indexing is superior to conservative investments in the long term. Although there were some huge market crashes after 2000 and 2008, the results of indexing were significantly better compared to conservative money market investments. There were only a couple of short time periods when the conservative investment balance was higher than the stock investment account balance. Those time periods lasted for only a couple of months right after the huge market crashes. The only difference is Japan where results of the conservative strategy and indexing were almost equal. This is an important conclusion for various pension schemes.

Hypothesis 1 (The long term buy & hold investment strategy that uses the cost averaging effect is successful in the long term, despite the major turbulences that hit financial markets from time to time.) can be accepted. Regular investments in a fund tracking a stock index (indexing) as well as regular investments in conservative assets of the money market experienced positive long term results, despite the major turbulences that affected the global financial markets (namely the dot com bubble, the global financial crisis and the European debt crisis). In Japan, the results were less positive although the recent trends show that the stock market returns start to improve. The results of our study have confirmed the conclusions of J.C. Bogle (2010) who says that an easy indexing strategy is able to outperform most of the actively managed portfolios that are able to beat the market only occasionally, not regularly. In other words, the indexing strategy may be negatively affected by the market turbulences but it is very effective over long time periods.

Hypothesis 2 (Investing in stock funds that track a stock index (i.e. indexing) is more efficient than investing in some conservative securities of the money market.) can be partially accepted. Although this hypothesis is valid for the U.S. and German markets, the conservative investment was a better choice than indexing in Japan. But it is important to note that the Japanese results are significantly affected by the specific nature of the 1985-2014 time period. The recent developments in Japan show that indexing outperforms conservative investments significantly. This is in accordance with conclusions of Siegel (2014) who says that the indexing strategy needs “stocks for the long run”. Although his studies usually use minimum time horizons of 7-10 years for stock investments, our analysis was based on 10 and 30 year time horizons. Our results show that the long term effects of the indexing strategy were further supported by the cost averaging effect. The regular monthly investments enabled us to mute the negative effects of the market cycles. We were able to buy the assets at lower prices during the market slumps, which led to decreased average costs. As the Japanese stock market grows, the dominance of the indexing strategy will become obvious.

It is also important to note that although the German stock market performed well over the analyzed time period, there is a real threat that it will have to face some headwinds in the coming years due to the problems of the European economy related to the still unresolved debt crisis. According to Sipko (2014) the European debt crisis was caused by a mixture of internal and external imbalances. Some of the economists talk about the possibility that the economic situation in Europe may be very similar to the Japanese lost decades in the coming years. In this case we should expect worse results of the European stock markets in the near

future. But as the analysis shows, indexing is superior to conservative investments. Sometimes it only takes a little more time.

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