

Paolo Sodini and Luis M. Viceira¹

The Value of Diversification

Diversification is the only free lunch in finance

The idea of diversification is one of the most powerful ideas in Finance, and probably the only “free lunch” available to investors. This Nobel Prize winning idea is behind many of the financial services that help us cope with risk and uncertainty, from car, life, or health insurance to mutual funds, exchanged-traded funds (ETFs), and all kinds of collective investment vehicles.

This idea is rooted in basic statistical science: While independent individual risks can be unpredictable, the frequency with which those risks tend to realize in a large population is largely predictable. We never know if we will be involved in a rear end collision as we get on the road, but the total number of such accidents in a given month in a region is much more predictable. This basic scientific fact opens to the door to one of the most fascinating ideas in finance: Risk sharing, or the idea that we can protect ourselves from the potentially devastating impact of individual risks by pooling them together and sharing their cost with others. This idea is behind one of the most important institutions in modern societies: Insurance.

This idea applies equally well in investing. Any company can experience a significant loss of value as the result of mistakes of its own making, such as designing a flawed new aircraft or folding phone screen, or Fortuna’s making, such as the death of a charismatic corporate leader in a ski accident or a technological discovery that deems a specific product suddenly obsolete. These idiosyncratic events are largely unpredictable, especially to outsiders. Investing all of our savings in one company exposes us to those potentially catastrophic risks.

But the overall frequency of such events is predictably bounded. We can avoid a disastrous idiosyncratic loss by investing in many companies, not just one, just like insurance companies are able to offer car insurance to all of us for a fraction of what it costs to fix a single car by pooling thousands of risks together, because only a few come predictably to fruition in a large population.

Finance goes well beyond translating this very important truth of Statistics into an investing insight. First, Finance notes that we as investors should require compensation for the risks we take. If we have two opportunities to invest, each of which we expect to pay a million krona in a year, we should be willing to pay more for the one whose payoff is more certain. Equivalently, in

¹ Paolo Sodini, PhD, is a Professor of Finance at Stockholm School of Economics, founding member of the CEPR Household Finance Network and author on several articles in Household Finance. Luis M. Viceira is the George E. Bates Professor at the Harvard Business School, a Research Associate at the National Bureau of Economic Research (NBER), a Fellow of the TIAA-CREF Institute, and a member of the Asset Allocation Advisory Board to Norges Bank Investment Management (NBIM), the manager of the sovereign wealth fund of Norway. He is also serving as co-chair of the NBER Conferences on New Developments in Long-Term Asset Management sponsored by NBIM, and the author of numerous award-winning articles and case studies on asset allocation and investing.

terms of return (the expected payoff divided by the price we pay), we should require a larger return on the riskier investment to invest in it.

Second, some risks are more diversifiable than others in the sense that their impact can be reduced more through diversification. Independent (or idiosyncratic) risks are more diversifiable than correlated risks. The impact of the loss of value from a failed product launch by a specific company on the value of a well diversified portfolio is trivially small, while the impact of a global recession might not be, because it is a risk that is likely to affect the value of most companies. Nevertheless, unless risks are perfectly correlated, diversification always helps reduce overall portfolio risk. Not all companies will be impacted in the same degree by a global recession.

Third, all investors (“the market”) are willing to hold diversifiable or idiosyncratic risks for very little compensation, while they require compensation for correlated risks. Indeed, the typical stock in the market has a return volatility which is twice the volatility of a well diversified portfolio (“the market portfolio”) but its average return is about the same as the return on the market portfolio. And within asset classes, riskier asset classes (such as equities) tend to have higher average returns than less risky asset classes (such as bonds). Unless one has very good reasons to concentrate one’s savings in very few securities, being undiversified is very costly. It simply increases the risk of significant loss for no obvious upside. In today’s world, we can dramatically reduce investment risk with no penalty in expected return through collective investment vehicles that charge extremely low fees. Diversification is indeed a free lunch.

An investor might find worth to be undiversified if she or he has insights about the future of specific companies, industries, or regions which are clearly superior to those held by every other investor in the market. But that investor should better make sure her or his insights are truly superior because there is another uncomfortable mathematical truth that might come to bite her or him: Active investing is a zero-sum game. One investor’s gain from holding a portfolio different from the market portfolio comes at the expense of another investor’s loss. If we are undiversified, we are either winners or losers. There is no middle ground.

Therefore, unless we are absolutely sure we have an informational advantage or some other powerful reason to be undiversified, we should aim at investing in the “world market portfolio,” that is, the portfolio that is as maximally diversified as possible, with each investment weighted by its relative size.

Home Bias

Investors tend to suffer from “home bias” or the tendency to either invest all their wealth in their own local market, or to allocate a disproportionately large share of their wealth to it. The proverbial ‘Belgian dentist’ thinks he knows about the Belgian market more than anyone else in the world. He does not realize there are analysts all over the world, in London, New York, or Hong Kong whose sole professional focus is to understand the Belgian market and who have access to Belgian companies and analytical resources the dentist would never even dream to have. This dentist concentrates his portfolio in Belgian stocks and bonds that represent a tiny

proportion of the global economy and capital markets. By doing so, he is implicitly making a bet that the Belgian economy will grow in the long run faster and better than the rest of the world.

This investor should ask himself whether this is a reasonable bet. It is far from obvious that betting on one specific region being better in ten or twenty years from now is safer than betting that the world as a whole will be better. There is little evidence that one large market has systematically dominated others over long horizons. The Japanese stock market handsomely beat all other large markets in the world during the 70's and most of the 80's, only to be at the bottom of performance since. The US stock market has been a clear winner over the last ten years, but it underperformed all other major stock markets in the world except Japan in the first ten years of this century. At long horizons, it is very hard to say which regional market will be the winner. Owning a geographically diversified portfolio appears to be a safer bet than trying to pick the next winner.

Some argue that the benefits of international diversification could be offset by carefully selecting stocks in your own country. The idea is that local investors have a better knowledge of companies at their doorstep than foreign investors, and thus they can pick them to generate a higher return than an internationally diversified portfolio. In order for this to be possible, it must be that at least some local stocks are mispriced, and that local investors are able to profit from that. Even though local investors might have an advantage compared to foreigners, there are several arguments against the possibility that their ability might persist in long run.

First, successful stock picking requires superior information, typically not public and difficult to obtain. Second, even if local investors have superior information, they will compete with each other, thus eliminating mispricing and, with it, their informational advantage with respect to foreigners. Third, foreigners can always choose to invest in local stocks through local professionals if they think locals have an informational advantage. Money flows very fast where there are opportunities, and drives mispricing away, eliminating the gains of investing locally. In all, it is far from certain that in the long run, local investors can exploit consistently and significantly their potential informational advantage.

There are two additional important arguments against holding portfolios concentrated in local stocks which might out-weight any possible informational advantage. First, the income of local investors and the returns to local stocks are likely to be exposed to the same sources of risk. Investing in local stocks exposes local households to the danger of *both* negative income shocks *and* capital losses on their savings. In other words, their financial wealth is likely to be low exactly when they face adverse income realizations and they need wealth the most. Instead of hedging, local households investing in local stocks engage in a form of anti-hedging strategy, which is typically a mistake.

Second, as explained above, investing in local stocks reduces portfolio diversification and exposes investors to idiosyncratic risk that is unlikely compensated by higher returns. One should remember that Sweden is only 1% of the world index, and the argument that Swedish companies might be representative and very correlated with international companies, if anything, strengthens the reason for investing internationally.

Some have also argued that investing abroad is either impossible or limited for many investors, and expensive. This argument doesn't hold any water today. In most modern economies, including Sweden, investors have very easy access to cheap mutual funds and ETFs that invest in global equities and bonds.

To the extent that local company returns are not affected by currency fluctuations, one reason to invest in local stocks is the possibility of limiting currency risk. However, institutional investors like pension funds and asset managers can cheaply limit currency risk through currency hedging contracts. We discuss currencies next.

Currencies

When we invest globally, we are also exposed to currency risk. US stocks trade in US dollars, and German stocks in Euros. The US stock market might do very well, but the US dollar could depreciate against the Krona, thus detracting from the performance experienced by a Swedish investor who invests in the US stock market. In other words, a Swedish investor who invests in a foreign market is making a double bet: one that this market will do well; the other is that the currency in which this market trades will appreciate.

Currencies are risky. Exchange rates fluctuate significantly in response to changes in interest rates, inflation, growth, and investor sentiment. Currency returns are significantly volatile. Table 1 shows the average return and volatility of eight large stock markets in their local currency and in dollars and their currencies over the period 1991-2019. Exchange rate volatility is very significant (as low as 7% per annum and as large as 20%) and it adds significantly to the volatility of investing abroad. The volatility of dollar returns of different markets (the returns a US investor would get from investing abroad) is significantly larger than the volatility that local investors would experience.

However, the risk of currencies appears to be uncompensated. Table 1 shows that generally the average return on currencies is zero. Over long periods, the average return of an investment in US dollars (i.e. buying dollars, putting those dollars in US bonds for safe keeping and gaining some interest, and then exchange them back into, say, euros) is not different from the average return the same investor can obtain by not buying dollars and instead investing in German bonds. In other words, typically a euro investor is not compensated for taking US dollar/euro risk passively. The average return on that investment over investing in domestic bonds is zero, while its volatility is significant.

Therefore, currencies add to the risk of a global portfolio, but there is no evidence that they add to its expected return. Table 1 shows this. Over the 1991-2019 period, the average return of a global portfolio in dollars is extremely similar to the average return in local currencies – about 11.6%. The currency bet implicit in investing abroad does not seem to be compensated over long horizons. This would be a risk that long-term investors would want to reduce or eliminate.

Unfortunately currency risk is hard to reduce or eliminate through diversification because the currency bets implicit in a global portfolio tend to be sizable. The US stock market represents as

much as 55% of global equities, so a global equity portfolio will have a very significant implicit bet in the US dollar. This added risk doesn't go away over time.

This leads to the notion of currency hedging. Investors can reduce currency risk by entering into currency hedging contracts in which a counterparty agrees to exchange the foreign currency back to the local currency in the future at a fixed rate, thus taking the risk of currency fluctuations off investors backs. These contracts are typically offered (or intermediated) by large global banks. To the extent that the cost of these contracts is not large, as it is typically the case for large currencies, currency hedging is a desirable feature of investing abroad.

Globalization and the benefits of international portfolio diversification

In recent decades, the world has experienced a process of liberalization and globalization of trade and capital flows not seen since the late 1800's and early 1900's. As a result of this dual process of liberalization, the correlation of global stock and bond markets has increased significantly over this period. Table 2 illustrates this phenomenon. It shows the correlation of the US stock market with other seven markets in the 1991-2001 period and in the 2002-2019 period. The average correlation has increased almost by half, from 48% to 70%.

Pundits have noted that this secular increase in correlations should have reduced the benefits of global portfolio diversification. However, there are two reasons why global portfolio diversification still makes sense.

First, while markets have become more correlated, they are far from being perfectly correlated. Investors can still achieve a meaningful reduction in portfolio risk without sacrificing return by being globally diversified. Table 3 shows that over the period 1991-2019, individual stock markets have produced a Sharpe ratio (the ratio of the return in the market in excess of a risk free investment over the volatility of the market) of about 38% on average. A global stock portfolio, on the other hand, has produced a Sharpe ratio of 57%. This is a very significant improvement.

Second, most investors have long investment horizons, particularly those saving for retirement. For long-term investors, what matters are long-run risks and correlations. And there is some evidence that the long-run correlations of global stock markets have not increased as much as short-run correlations as a result of globalization. The volatility and correlation of markets is driven by two distinct factors. One factor is fundamentals, i.e., growth. The other is investor risk tolerance or sentiment. Trade globalization has contributed to making fundamentals more correlated across markets. Financial globalization has contributed to making investor sentiment more correlated – or, more precisely, it has made contagion easier as capital now flows freely across borders.

Each of these factors impact market correlations and volatility differently. Investor sentiment is transitory in nature. Thus it has a much more pronounced impact on short-term volatility and correlations. By contrast, fundamentals impact equally short-run and long-run volatility and correlations.

As a result, globalization has had a much larger impact on short-run correlations than on long-run correlations. Although arguably globalization has reduced the benefits of global portfolio diversification, this reduction is concentrated mostly at short-horizons. Long-horizon investors still have plenty to benefit from being globally diversified.

Are individual households diversified?

We have evidence that high net worth households achieve a good level of diversification by holding portfolios that invest directly in a considerable number of stocks. In other words, instead of investing in one or two mutual funds, they hold many stocks directly. Moreover, we observe in the data that the number of directly held stocks increases strongly with household wealth. This could be a good strategy when funds charge large fees. It can also be tax efficient.

Otherwise, households are typically able to reach a good level of diversification by investing in mutual funds. Investors should try to avoid paying high fund fees, for example by investing in index funds and ETFs.

Leaving high net worth households aside, on average individual investors tend to hold very few stocks directly, which is not nearly enough to achieve appropriate diversification, but they limit the diversification losses from holding concentrated portfolios by investing only a low fraction of their financial wealth in those stocks. Financially sophisticated households tend to invest the rest of their wealth in mutual funds that give them the benefits of and therefore diversification.

Poorer and less educated households, instead, keep most of their financial wealth in bank accounts. This is a mixed blessing. On the one hand, they avoid investing substantially in poorly diversified portfolios holding only a few stocks, and thus limit their diversification losses. On the other hand, by keeping most of their savings in a bank account, they fail to harvest the risk premium, or extra return, that a properly diversified portfolio across stocks and bonds can produce over the interest on cash accounts.

Unless investors are extremely low tolerance for risk, holding most of financial wealth in cash can be a major mistake, particularly for young and middle aged investors, because of the compounding effect of this extra return on wealth accumulation. An urban legend claims that Albert Einstein once said that “compounding interest is the eighth wonder of the world.” Whether he said it or not, the reality is that compounding is a very powerful force. Over 30 years, wealth compounded at 2% grows 81%, but wealth invested at 5% grows 332%. In other words, investing at 5%, rather than 2%, over 30 years will yield a cumulative growth more than four times larger.

Overall, high net worth and financially sophisticated households are better diversified either through diversified portfolios of directly held stocks, or by investing in mutual funds. Poorer and less educated households instead tend to hold only stocks and only a few of them. However, they also keep most of their money in their bank account limiting the perils of holding very undiversified portfolios, but also reducing severely the return they earn on their savings. This might be a costly mistake for young households as they save for the long term.

Helping households get access to inexpensive and well diversified mutual funds and ETFs is key to improve diversification for individual investors, particularly for those that are more in need of it. The long-run effects of diversification and the ability to gain exposure to global risk premia should never be underestimated.

References

Bach, Laurent, Laurent E. Calvet and Paolo Sodini, Rich Pickings? Risk, Return, and Skill in the Portfolios of the Wealthy, *American Economic Review*, forthcoming

Betermier, Sébastien, Laurent E. Calvet, and Paolo Sodini, Who are the Value and Growth Investors? *Journal of Finance*, Vol. 72 No. 1 pp. 5-46, February 2017

Calvet Laurent E., John Y. Campbell and Paolo Sodini, Down or Out: Assessing the Welfare Costs of Household Investment Mistakes, *Journal of Political Economy*, Vol. 115 No. 5 pp. 707-747, October 2007

Campbell, John Y., Karine Serfaty-de Medeiros, and Luis M. Viceira, Global Currency Hedging, *Journal of Finance*, Vol. 65 No. 1: 87–121, February 2010

Viceira, Luis M., "Life-Cycle Funds ." Chap. 5 in Overcoming the Saving Slump: How to Increase the Effectiveness of Financial Education and Saving Programs, edited by Annamaria Lusardi. University of Chicago Press, 2008

Campbell, John Y., and Luis M. Viceira, Strategic Asset Allocation: Portfolio Choice for Long-Term Investors. Oxford University Press, 2002.

Viceira, Luis M., and Zixuan (Kevin) Wang. "Global Portfolio Diversification for Long-Horizon Investors." Harvard Business School Working Paper, No. 17-085, March 2017. (Revised July 2018.)

Table 1

1991-2019	Local Returns								
	Australia	Canada	China	Germany	India	Japan	U.K.	U.S.	Average
Annualized Mean	11.6%	10.7%	16.7%	9.2%	20.7%	3.0%	9.9%	11.6%	11.7%
Annualized Stdev	13%	13%	35%	18%	32%	18%	14%	14%	19.6%
\$ Returns									
Annualized Mean	Australia	Canada	China	Germany	India	Japan	U.K.	U.S.	Average
	12.5%	11.0%	16.7%	12.8%	15.9%	3.9%	8.6%	11.6%	11.6%
Annualized Stdev	20%	18%	36%	27%	33%	18%	16%	14%	22.9%

	FX Returns								Average
	Australia	Canada	China	Germany	India	Japan	U.K.		
Annualized Mean	0.2%	-0.2%	-0.7%	3.3%	-4.3%	1.3%	-1.1%		-0.2%
Annualized Stdev	11%	8%	7%	20%	8%	11%	9%		10.4%

Table 2

	Correlation of Local Returns and US Returns								Average
	Australia	Canada	China	Germany	India	Japan	U.K.		
1991-2019	68%	78%	40%	74%	29%	51%	77%	60%	
1991-2001	58%	77%	24%	61%	9%	37%	67%	48%	
2002-2019	75%	79%	55%	83%	53%	61%	83%	70%	

Table 3

	Sharpe Ratio (\$ Returns)								Global Portfolio (\$)
	Australia	Canada	China	Germany	India	Japan	U.K.	U.S.	
1991-2019									
Sharpe Ratio	48.6%	44.6%	37.9%	36.8%	39.0%	5.6%	35.7%	60.4%	38.1% 56.9%