

Speech

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Households, stock markets and the financial system

Share Promotion Association

Thank you for inviting me to the Share Promotion Association to talk about households, stock markets and the financial system. This means that today I shall not be talking about current monetary policy.

First let me note that since the deregulation of financial markets in the 1970s and '80s, central banks around the world have become increasingly interested in the financial system's various functions and institutions. One reason for this lies in the system's central place in society's infrastructure. Just as it is important that networks for transport, electricity and telecommunications function properly, so is it essential that, for example, payments can be transacted, capital can be saved and channelled to the most profitable investment projects and that both households and firms get help in handling financial uncertainty and risk as well as possibilities of spreading consumption over time. Production and employment are liable to be hit to varying degrees if, for some reason, parts of the financial system do not work as they should or even break down completely.

Moreover, experience has taught us that the price of shares and other assets plays a major part in the dynamics of economic growth. Rising share prices, for instance, tend to stimulate private consumption and business investment and vice versa. It follows that stock market trends are also relevant for monetary policy.

So there are a number of good reasons for a central bank to take a closer look at and reflect on how the financial system functions.

In recent decades the financial system in most western countries has undergone a notable transformation. One feature of this development is disintermediation, a process whereby a larger proportion of the funds involved in saving and financing

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flow directly to the financial markets instead of being routed via the banks' traditional lending and deposit operations. The general public's heightened interest in share investment, either directly or through mutual funds, has been an important component of this process. Statistics show that in recent decades shares have made up an increasingly large proportion of households' financial assets. In the same period, moreover, and not least in recent years, it is evident from your Association's regular surveys that share ownership in Sweden has spread very rapidly.

The stock market displays a number of interesting phenomena. In recent decades the real return on shares in Sweden has been almost three times higher than the long-term trend. In this period there have also been a number of dramatic developments, for instance the stock-market crash in 1987, the long downward period in the early 1990s, the mini-crash in 1998 and the IT bubble at the turn of the century.

All this raises a variety of interesting issues. Today I shall confine my brief remarks to some aspects that have to do with the fact that shares now weigh considerably more heavily in household financial portfolios than was the case thirty years ago. As I just said, this development has coincided with a return on shares that has been very high historically. Sooner or later, however, there will be a normalisation, more or less in line with what has happened in the past. This is so because the return on shares is ultimately determined by corporate profits, which are bound up in turn with economic development in general. GDP represents the sum of all profits and wages in the economy and it is hard to see how an annual real growth rate of around 2 per cent could result in a development of corporate profits that warrants a real annual return on shares that averages around 20 per cent.

A more "normal" combination of stock-market returns and risks makes saving in shares more troublesome than it has been with the good returns in the past twenty years. The financial system will need to do more than before to help households manage the risks associated with stock markets. The question is how this change is likely to occur.

Greatly increased household saving in shares

One factor behind the growing interest in share investment in Sweden in the late 1970s may have been the low valuations initially. A relatively weak stock-market trend in the 1960s and '70s no doubt fed expectations of a favourable return in the future. Another factor was certainly that the real return on bank deposits had been negative at times in the 1970s. Moreover, the introduction of mutual funds with tax incentives in the late 1970s and their subsequent replacement by a national savings system presumably drew many people's attention to the stock market. It is also conceivable that the rise of economic journalism in the 1970s and '80s contributed to a greater interest in the stock market. Neither should the formation of the Shareholders Association and the Share Promotion Association in the 1960s and 1970s, respectively, be overlooked. More knowledge and information certainly contributed.

However, the increased saving in shares is one item in a larger context, in Sweden as well as other western industrialised countries. I mentioned earlier that Swedish households have transferred much of their traditional saving from banks to other instruments. Thirty years ago, bank deposits and other very liquid assets with little risk made up almost 60 per cent of households' financial wealth, as against less than 20 per cent today. The major part of this adjustment in financial portfolios has gone to shares but a good deal now takes the form of insurance saving. The trend towards forms of saving with a higher risk has been accentuated by new rules for insurance companies, permitting a high proportion of shares, although this is arranged more indirectly. Similar tendencies are to be found in other industrialised countries. So it is not just in Sweden that saving has moved away from traditional bank deposits.

One underlying factor is probably demographic. People traditionally tend to save more in the phase of life when their children are old enough to leave home. In that the large birth cohorts from the 1940s reached that age during the 1980s, there was no doubt an increase in the propensity to save for the longer term. Moreover, people today live longer on average than before, which means that they work for a shorter proportion of their lives, so the higher return that often results from long-term saving comes in handy to maintain their standard of living. Changes in tax, transfer and pensions systems also tend to move in the same direction. The fact that rising standards of living and a better yield have boosted households' financial wealth may also have raised the propensity to take risks. Additional factors may be decreased transaction costs, more access to information and the simpler procedures for share dealing compared with the situation twenty to thirty years ago. Many of these changes have occurred as a result of technical innovations, not least the advent of the internet.

Long-term saving requires an ability to manage the associated risks. Share prices fluctuate widely, in marked contrast to the stability of bank deposits. If the fluctuations occur around a steeply rising yield, as they did in the end of the 1970s and during the 1990s, the problems may not be particularly great. Even bad advice can be forgiven when things are going well. But the time comes when stock-market yields fall back to a more "normal" trend and the fluctuations in share prices are then of greater importance for investors.

It follows that in future households will need qualified assistance and support in order to arrive at the best and safest ways of investing their assets. As I said earlier, this is a task for the financial system's institutions: banks, security companies and so on. Performing in the stock market is not all that easy when yields are more normal. If inexperienced people are enticed into buying shares for money they will soon need for other purposes, the results can be tragic. Similarly, the consequences may be fatal if a stock-market collapse erodes pension capital just when it is most needed for retirement.

In order to illustrate the challenges and risks associated with share investment, let me now very briefly summarise some of the established theories. Not even professional financial agents find it particularly easy to perform successfully in the stock market. There are plenty of situations when steeply falling share prices make the ordinary share investor feel nervous and uncertain. What, then, should an

ordinary household do to avoid running into trouble? So let me present what is perhaps a simplified background to some of the ideas and theories that explain the behaviour of financial markets.

What governs share yields?

Much of the time-honoured advice that is now disseminated to optimise share investment is based on what Harry Markowitz arrived at half a century ago as a 25-year-old graduate student at Chicago University.ⁱ Share investment involves risks that can be reduced by not putting all the eggs in one basket. Buying one particular share entails risks of two types; one to do with conditions pertaining to the company in question, the other with the economy in general, that is, factors affecting the stock market as a whole. Markowitz showed that with a portfolio made up of shares in a sufficient variety of companies and industries, the company-specific risks virtually cancel out. The risk inherent in the stock market's overall fluctuations remains but the aggregate risk is reduced.

This insight was soon followed by the efficient-market hypothesis, which became a central tenet in the literature and has far-reaching implications.ⁱⁱ It implies, for example, that consistently beating the market, so that the return exceeds the average for all shares, is out of the question. As the market always knows best, active management or even individual analysis by the ordinary share investor is pointless. The optimum is invariably a passive portfolio that mirrors the market. In this way, the amateur can achieve just as good a return as the professional.

The efficient-market hypothesis presupposes that investors are rational and base share valuations on fundamental factors. If their market behaviour is not rational, it is assumed to be random, which means that individual actions have no impact on financial prices. If irrational players nevertheless act in a similar way, any influence on financial prices is eliminated by other, more professional agents via arbitrage, which is assumed to be quick and effective.ⁱⁱⁱ The irrational players accordingly suffer losses and therefore ultimately leave the market. In this way, the competition between rational and irrational investors, together with the existence of arbitrage, results in financial markets remaining efficient.

In the past two decades, however, the notion of financial market efficiency has been challenged,^{iv} which will hardly surprise those with practical experience. This is mainly because the possibility of arbitrage has proved to be much more limited than assumed earlier. Studies in recent years have demonstrated the occurrence of periods when prices deviate appreciably from more fundamental levels. A new line in financial science, Behavioural Finance, has emerged, aimed at explaining why price deviations occur and developing tools for predicting them. Academics in this field have turned to experimental psychology and other disciplines to explain the mind-set of financial market players.^v

In a notable paper by a Princeton professor, Robert Shiller, it had already been shown in the early 1980s that share prices are considerably more volatile than would be expected if they were determined by the current value of expected future dividends.^{vi} This was remarkable in that according to the efficient-market hypothesis, it is only changes in fundamental factors, for instance profits or dividends, that ought to affect share prices.

Further studies later in the 1980s indicated that future developments can be explained by historical price movements. A look at the share prices of two groups of firms – extreme losers and extreme winners – reveals that the group with the worst share performance in the first period gives a better return in the coming five years than the group that did best and vice versa. In the second period the undervalued shares recovered their fundamental value and the overvalued fell correspondingly. Studies with a shorter horizon confirm that shares which have begun to rise continue to do so and conversely, shares which have started to fall often continue to do so in the short run. The intuitive explanation for these findings is that stock markets frequently over-react both upwards and downwards.^{vii}

Something that no doubt helped to question the explanatory power of the efficient-market hypothesis was the stock market crash in 1987, when the Dow Jones index plummeted 22.6 per cent – the largest-ever one-day fall in the United States. This dramatic event demonstrated that share prices can fall even though nothing more fundamental has happened; a thorough search failed to detect any specific or unexpected development that might account for the crash. It also seems to be the case more generally that many price movements are not occasioned by new information; a study of the fifty largest one-day share price movements in the United States in the post-war period confirms this.^{viii} Moreover, a number of studies have shown that price movements have occurred solely because the company in question has been included in or excluded from Standard & Poor's 500 index, without any new information about fundamentals.

One explanation for over-reactions in financial markets can be derived from the finding in experimental psychology that people often perceive a wider pattern in the light of just a few observations that are actually entirely random. In the present context this means that a succession of good news items about a company's profits may lead investors to project the trend well into the future and accordingly generate an over-reaction; if the share price then rises, this is seen as confirming the analysis. A period of good returns also boosts the investor's self-confidence, making her/him bolder and more prone to take risks. Bit by bit the over-reaction takes shape and, if the worst comes to the worst, leads to a bubble.^{ix}

The roots of sizeable speculative bubbles often lie in some popular theory that is seen as being supported by reliable figures or analyses.^x Topical examples are such concepts as 'the new economy' or 'the new economic era'. Although they may be highly exaggerated or even completely wrong, so-called theories of this kind easily become conventional wisdom. As pointed out more than a century ago by the American psychologist William James, an important factor behind human behaviour is attention; as also demonstrated by later psychological studies, we tend to direct our attention at whatever is attracting the attention of others. A major role in this process is frequently played by the media. It should be born in mind, however, that media operate in a highly competitive environment that makes it difficult for them to stand apart from the conventional wisdom. But media can both accentuate and modify the prevailing consensus.

A phenomenon – also studied in experimental psychology – that works against taking an independent stance is group thinking. It is not easy to stick to an opinion that differs from what a majority of the group seems to hold; "surely all the others

cannot be wrong” is a common thought. People who go their own way are liable to be regarded as have-beens with little influence or significance.^{xi} We are also liable to succumb to wishful thinking. Supporters of a football club or a political party, for instance, are not infrequently over-confident about the chances of winning.^{xii} Another example with which you may be familiar is the reluctance to enter a restaurant that is empty; people generally prefer one that has many guests – they simply rely on the judgement of others.

In this way our inherent behaviour can generate both optimistic and pessimistic over-reactions. Herd behaviour pulls share prices far beyond what is fundamentally warranted. If things go really wrong, the result may be a financial bubble that – just like any bubble – sooner or later bursts, with dramatic consequences.

Those with practical experience of financial markets will readily find themselves at home in this new theoretical and empirical analysis. In the 1990s there were a number of bubble-like developments where prices ceased to mirror fundamental values. The one that comes to mind first is perhaps the IT bubble. Another is the bond market; in the early 1990s bond rates in many parts of the world declined to low levels and when the U.S. Federal Reserve then raised its instrumental rate at the beginning of February 1994, bond rates moved up sharply in the following months.

To sum up, new interesting theoretical and empirical arguments have been put forward in the past two decades against the notion that financial markets are efficient. They show that via increased or decreased demand, investors may well pull financial prices away from their fundamental level. Over-reactions can occur so that excessive euphoria drives prices unduly high, just as undue pessimism can push them down too far.

How can households benefit from stock markets?

The combination of Markowitz’ approach to risk diversion and the efficient-market hypothesis meant that for a long time the best advice for saving in equity has been to build up and hold onto a broad portfolio that more or less mirrors the stock market as a whole. In that way, even an amateur could obtain the relatively higher yield that the stock market provides in the long run compared with other financial investments. This diagram shows that such a diversified share portfolio gives an average annual real return of approximately 7 per cent, which is appreciably more than financial alternatives (Diagram 1). The next diagram shows, moreover, that the level of this return has been stable over long periods (Diagram 2). But it will also be seen that in certain periods the return has deviated rather markedly from the trend. That raises the question of how long the horizon needs to be for a diversified portfolio to actually yield a good return.^{xiii}

The third diagram plots the highest and lowest real returns for rolling investment horizons of different duration between 1918 and 1996 (Diagram 3). It will be seen that with a five-year horizon in this period, the best average annual return has been 26 per cent; with an unfavourable initial year, however, the average annual return could be as poor as –9 per cent; moreover, even such a long horizon as twenty or thirty years did not guarantee a return on a par with the trend. The return is admittedly positive for all the rolling periods but even for such a long horizon as

twenty years the return on equity was worse than for bonds and bank deposits in 5 per cent of the cases.

This raises the issue of timing, that is, when to start saving in shares. Doing so at a time when stock market prices are high may entail a long – in some cases very long – wait for a return that is even in the vicinity of the trend. One way, used by many people, of coping with the problem of timing is to spread the investments over time. Saving regularly in particular shares or a mutual fund reduces the problem of timing but experience shows that the inputs should be spread over a long period. Another approach involves using various methods to assess when the stock market is high or low; as I need hardly point out to such an experienced assembly, this is not exactly easy.

While many people definitely do adopt these strategies, based on proven experience, this is by no means the case for every household or individual. Some clearly aim for the big deal and search in various ways for potential winners. This has been evident not least in recent years. Day trading is a concept that has been coined to denote private attempts to make a quick profit from short-run dealing in shares. IT and telecom shares became popular in the late 1990s as a growing number of people were attracted by these categories. Less has been heard about these players recently, perhaps because falling share prices have led to losses.

As I have indicated, without a sufficiently diversified portfolio, saving in shares entails risks that are unnecessarily large in the sense that they are not commensurate with expected profits. Even so, a good many private investors have gone in for more risky strategies of this type.

To my knowledge, there are unfortunately no studies that systematically illustrate more precisely how people in Sweden have managed their saving in shares. A research paper from the United States points out that the IT boom, combined with markedly lower transaction costs as a result of new technology, induced many inexperienced people to invest in shares.^{xiv} Moreover, access to the internet leads to an increased number of share transactions, with poorer results. These less experienced players have tended to concentrate on the technology-oriented Nasdaq exchange. Whereas more professional and institutional investors account for 90 per cent of transactions on the New York exchange, approximately half of Nasdaq dealing is by private individuals.^{xv} American investors are also becoming younger; the proportion who are under 35 and make more than six transactions a year rose from 1.1 per cent in 1995 to 13.2 per cent in 1998. The same tendency applies to stockbrokers and financial consultants, more than half of whom began their careers in the 1990s. All this indicates that large numbers of inexperienced investors entered the market in the 1990s and that a high proportion of their brokers and consultants unfortunately have relatively little experience. On the other hand, many of the newcomers working in financial markets have had a thorough training that is often better and – perhaps more important – more up-to-date than many of their older colleagues’.

The fact that many people have entered the stock market in a short time is not entirely a good thing. Besides the losses they may incur and thereby run into financial difficulties, there is a risk of the stock market functioning less well because prices bolt from more fundamental levels. An example of this is the IT bubble in

recent years. The ease with which firms attract capital in an over-valued market leads to misinvestment which, if it becomes too prevalent, can be harmful for society in general when the economy and the stock market both turn downwards. The behaviour of inexperienced investors is thus a general economic issue.

The American study argues that firms, banks and analysts had incentives to talk inexperienced people into investing in new enterprises on grounds that were not entirely sound. Many new technology companies were not generating a profit and had to rely instead on paying for wages and equipment by issuing shares. For this to be feasible, stock markets need to be high. In this sense there were incentives for managements to trim reports and statements about their firm's future profits. At the same time, analysts and investment banks, with potential earnings from launching share issues, lacked incentives to take a critical look at these reports and statements. Inexperienced investors did not get the assistance and support they needed. As a sign of this, the paper mentioned that in summer 2000 professional analysts were summoned to Washington for a congressional hearing on their market recommendations. The results showed that in the period before the Nasdaq index fell as much as 60 per cent, less than 1 per cent of the recommendations had been to sell. The media subscribed to the exuberant mood with reports of rapidly rising share prices and the notion that quick money could be earned in the so-called new economy became the conventional wisdom. In retrospect we know that while share prices for IT and other new companies did rise rapidly for a number of years, they could also fall very quickly. Could there be a better illustration of a financial market bubble?

Here I want to call for studies like those in the United States to throw more light on whether and, if so, to what extent there were also similar tendencies in Sweden. For the time being we shall have to make do with occasional observations and more anecdotal information. There is little doubt about the Swedish stock market also being feverish in the late 1990s, with many inexperienced newcomers. As far as I know, a good many companies were operating at a loss and issued shares. Neither did I detect a massive increase in sell recommendations before the IT bubble began to collapse. So a cautious conclusion at present could be that certain tendencies that were evident in the United States may also have been present in Sweden.

How can households' risks be reduced?

Besides calling for more knowledge about what actually happened while the IT bubble was growing, the course of events raises what is perhaps the more important question of what can be done to provide more support in the future for long-term saving by households. It is essential for society in general that stock markets function properly. At the same time, households need an adequate return on their savings and should be in a position to identify and manage different types of risk.

Basically, this is a matter of education. Over the years, the Swedish Share Promotion Association and the Swedish Shareholders Association have done much to improve people's knowledge of these matters. Information that is prompt, up-to-date, correct and relevant is likewise crucial. The new technology is inundating us with information but more does not necessarily mean better. It follows that households must be helped to interpret the information and pick out what matters most. An important role in this respect is played by independent analysts and

consultants, not to mention media. These agents can see through and criticise corporate managements that are unduly optimistic or provide information selectively.

But all this is already available. It can, of course, be said that if only everyone becomes better at obtaining knowledge, information and critical assessments, it is possible that more households than at present can actually come closer than before to the stock market's return. Unwarranted euphoria can be avoided and share prices can be more stable.

At the same time it can be said that the problems go deeper than that and have to do with how the financial system functions today.

It is certainly true that in recent decades, financial deregulations, new financial products, improved data and telecommunications and the development of financial theory have led to an outstanding and rather fantastic growth and transformation of the financial system in many parts of the world.

Even so, to a growing extent households face what are sometimes very difficult risk-management decisions that were not called for or even possible earlier. Many people still lack the requisite knowledge for this and it may be asked whether people in general can be expected to have such knowledge in the future. Everyone cannot be a specialist in risk management and financial theory.

As I have indicated, one reason why households face a more difficult situation than before is, of course, the substantially greater exposure to the stock market that stems from disintermediation. But this tendency has been accentuated by the new pension system. It is now up to the individual to decide how a part of her/his pension capital is to be invested. Moreover, the problems with complex risk management are exacerbated in that perhaps the most important component available to an individual is human capital, with all the forms of risk connected with its management and yield. In addition, households encounter complicated decisions in other aspects of life, of which some have to do with insurance products.

As I just said, the financial system has already changed spectacularly and become increasingly sophisticated. But it will not stop there. It may therefore be asked whether banks and other financial institutions will become increasingly consumer oriented in the future, instead of the current focus on products. One advocate of such a development is Robert Merton, a Harvard professor who predicts that financial institutions will split into one group that produces business services and another that is close to consumers and mainly distributes financial services.^{xvi} Banks today often perform both these functions.

Merton considers that in such a new consumer-oriented financial system, help is needed to construct well thought-out, tailor-made plans for the life cycle that allow for all the potential risks. One type of risk that needs to be considered is stock market fluctuations. Central matters here are, of course, investment horizons, how buying and selling is arranged and the degree of diversification across companies and geographical regions. Another parameter is, as indicated, the life cycle; the possibility of saving for the long run is restricted by how much capital is likely to be needed in the nearer future. The risk profile's covariation with the return on

human capital has to be considered, too; perhaps a stockbroker, for example, should be wary of exposing even her/his personal financial savings to the stock market. Other risks lie in fluctuations in the price of a home that one either owns or is saving up for, as well as in the financing costs and, not least, the cost of refinancing; even if the mortgage rate is fixed, when the time comes to renew the loan it may be too high. The risks inherent in price fluctuations apply to other capital goods, too. It is also necessary to consider the risks in any saving plan for children's education or for personal supplementary health insurance and life assurance. Perhaps it would even be advisable to allow for the risks that are covered today by insurance against fire, theft and accidents.

Merton's point is that there is a composite package of risks that is specific to each person and needs to be identified and covered. The management of all these risks calls not only for professional advice in the construction of such a plan but also for tailor-made financial products. The plan can include a variety of financial instruments but these must be easy for the individual household to understand in order to form a picture of and decide about the potential risks. However, the construction and provision of composite financial products that are easy for consumers to understand may be extremely complex. The new producers of financial services therefore face considerable challenges.

Let me illustrate all this with one of the examples Merton offers. Assume that a family wants to save for the children's university education. Even if the education is free, there may be costs for textbooks, food, lodging, travel and so on. And if it is a matter of studying abroad, even the education may have to be paid for. Relevant questions are the amount that needs to be saved, the likely return and the total cost when the education is ultimately complete. One solution would be for the sophisticated financial institute to draw up a contract whereby all the specified costs are financed during a given future period. The family gets a payment schedule that specifies all the requisite savings. In this example it is the bank or other financial institute that carries the various risks, not the individual household. So besides receiving advice about how to behave in order to save up for education, the household concludes a contract – a tailor-made financial instrument – that specifies payments and deliveries. The institute is more competent at managing risks than the individual function and therefore performs this function.

Another example of financial innovations that households can use to reduce long-term risk exposure is financial products related to some real-estate index. Given a well-established measure of this kind (with a status equivalent to that of the consumer price index, for instance), financial products ranging from forward traded instruments to loan agreements with terms based on a real-estate index, would enable households, for a reasonable sum, to reduce exposure to the risk of a large fall in property prices.

This process is already under way. Banks have made varying progress in their customer orientation. Independent financial consultants have also begun to some extent. Increasingly composite financial products are being constructed and distributed. The range of mutual funds offered by banks includes funds owned by others. So perhaps one can say that the development towards more consumer orientation has already begun but the decisive steps still lie ahead.

Re-regulations of the financial system, perhaps accompanied by amended tax regulations, may be needed, of course, to produce the course Merton points out but there is also a need for new structures in the financial system. Another requirement is appreciably more knowledge about how, for example, the systems' productive components can identify and spread the risks that may have to be taken. Still, I am sure you will agree that this opens up new and truly interesting perspectives for the future in many fields of the life cycle as well as for the development of the financial system.

Such a development might also lead to some savings finding their way back to the financial institutions and to markets being dominated by more professional players. Perhaps it would also render financial markets more stable. It could be welcomed by individual households that want to save in shares but are uneasy about the risks. That I believe is the case for many of those who succumbed to the exuberance in the late 1990s and subsequently saw their savings dwindle. At the same time, a good many people in Sweden will no doubt want to go on saving directly in shares.

Let me conclude by presenting an authority's perspective on this matter, in which the Riksbank, together with Finansinspektionen (Sweden's financial supervisory authority) and the Ministry of Finance, plays a significant role. In order to reduce the risk of financial market imbalances, it is important that we have a well thought-out legislative, regulatory and supervisory infrastructure that functions properly and follows any changes in the rest of the world. This is a never-ending task that requires the participation of all concerned.

ⁱ Markowitz, H.M. (1952), Portfolio selection, *J. of Finance*, VII:1 (March), pp. 77–91.

ⁱⁱ Fama, E. (1970), Efficient capital markets: a review of theory and empirical work, *J. of Finance* 25, pp. 383–417.

ⁱⁱⁱ This point has been made by, for instance, Milton Friedman and Eugene Fama; see Friedman, M. (1953), The case for flexible exchange rates, in *Essays in Positive Economics*, University of Chicago Press, and Fama, E. (1965), The behavior of stock market prices, *J. of Business* 38, pp. 34–106.

^{iv} Perhaps I should point out that the academic discussion between advocates of the efficient market and those with somewhat different views is still in progress; the advent of the Behavioural Finance school has not left the former at a loss for words.

^v For an introduction to Behavioural Finance, see Shleifer, A. (2000), Inefficient markets, *Clarendon Lectures in Economics*, Oxford University Press. See also Shiller, R.J. (2001), Bubbles, human judgment and expert opinion, *Cowles Foundation Discussion Paper 1303*, Yale University. The senior economist at Föreningssparbanken has written an introduction to the subject that has also attracted attention: Fromlet, H. (2001), Behavioral finance – theory and practical application, *Business Economics* (July), pp. 63–69.

^{vi} See Shiller, R. (1981), DO stock prices move too much to be justified by subsequent changes in dividends, *American Economic Review* 71, pp. 421–436.

^{vii} See De Bondt, W.F.M. & Thaler, R. (1985), Does the stock market overreact?, *J. of Finance* 40, pp. 793–805; also Jegadeesh, N. & Titman, S. (1993), Returns to buying winners and selling losers: implications for stock market efficiency, *ibid.* 48, pp. 65–91.

^{viii} Cutler, D. Poterba, J. & Summers, L. (1991), Speculative dynamics, *Review of Economic Studies* 58, pp. 520–546.

^{ix} See e.g. Tversky, A. & Kahneman, D. (1974), Judgement under uncertainty: heuristics and biases, *Science* 185, pp. 1124–1131.

^x Shiller, R. (2000), *Irrational Exuberance*, Princeton University Press, New Jersey.

^{xi} Janis, I.L. (1982), *Groupthink* (2nd ed.), Houghton Mifflin Co., Boston.

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- ^{xii} Babad, E. (1987), Wishful thinking and objectivity among sport fans, *Social Behavior: An International J. of Applied Social Psychology* 4, pp. 231–240.
- ^{xiii} All three diagrams come from Bäckström, U. (2000), *Tankar om aktiesparande* ('Thoughts about saving in shares') Ekerlids Förlag, Stockholm.
- ^{xiv} D'Avolio, G., Gildor, E. & Shleifer, A. (2001), *Technology, information production and market efficiency*, paper presented at the Federal Reserve Bank of Kansas City Symposium in Jackson Hole (August).
- ^{xv} See also Blume, M. (2000), *The structure of the U.S. equity markets*, Rodney L. White Center for Financial Research, paper 17-00, The Wharton School, University of Pennsylvania.
- ^{xvi} Merton, R.C. (2000), *Finance and the role of financial engineering in the 21st century*, unpublished, Harvard University.