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**The Lehman Sisters Hypothesis: an exploration of
literature and bankers**

Irene van Staveren

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Table of Contents

ABSTRACT	4
1 INTRODUCTION	5
2 AN EXPLORATORY SURVEY AMONG DUTCH FINANCIAL PROFESSIONALS	6
3 LSH DIMENSION ONE: RISK ATTITUDE	8
4 LSH DIMENSION TWO: RULES & RESPONSIBILITY	14
5 LSH DIMENSION THREE: LEADERSHIP	17
7 CONCLUSION	20
REFERENCES	23

ABSTRACT

This article tests the Lehman Sisters Hypothesis in two complementary, although incomplete ways. It reviews the diverse empirical literature in behavioural, experimental, and neuroeconomics as well as related fields of behavioural research. And it presents the findings from an explorative survey among Dutch financial professionals. The conclusion is that both methods find support for the Lehman Sisters Hypothesis. It shows that gender stereotypes are still influential, constraining women to achieve top positions in banking. At the same time, the analysis indicates that women perform better than men in finance and that female leaders have more balanced management skills than men and are rated as better leaders. This would plea for having more rather than less women at the top of the financial sector.

Keywords

Gender, finance, financial crisis, risk

The Lehman Sisters Hypothesis¹

An exploration of literature and bankers

1 Introduction

When the financial crisis broke out with the fall of Lehman Brothers, some commentators drew attention to the behavioural aspects of bankers. One way in which this was done was by suggesting that it is particularly masculine behaviour, largely exhibited by male bankers, that is responsible for the high-risk-lobby-for-less-regulation-perverse-incentive nexus behind the crisis. EU commissioners Neelie Kroes and Viviane Reding as well as former UK Minister Harriet Harman phrased this masculine nexus as the Lehman Sisters thesis. In this paper, I will discuss the empirical literature that relates to this thesis suggesting that with more women in the top of banking, we would not have had this crisis. I will illustrate my discussion with the results from an exploratory survey that I have carried out among financial sector professionals in The Netherlands. The objective of the empirical analysis is not a robust testing of the hypothesis, which would require an extensive longitudinal empirical study among men and women in the financial sector with all the necessary control variables. Instead, my analysis seeks to understand the three major nature-nurture dimensions underlying the Lehman Sisters Hypothesis (LSH), which makes it such an appealing as well as contested thesis in public debate. These three dimensions are risk attitude, rules and responsibility, and leadership.

Before going into the LSH, it is useful to briefly review the male/female ratio in banking. The World Economic Forum's gender report for 2010 indicates that only 2% of CEO's in the Financial Services & Insurance industry in 20 surveyed countries is female, as compared to 6% for all industries (Zahidi and Ibarra, 2010). Nevertheless, women have been playing an active role in finance for centuries. In the UK, for example, in the year 1840, women held 40% of governments stocks (Rutterford and Maltby, 2006). In terms of employees, the financial sector has been feminizing for quite some time, with an increasing share of women in face-to-face jobs in banks, insurance companies, and in personalized areas such as wealth management. But not only at the top of finance the share of women is very low, also in the types of functions where most money can be made and where least human contact is involved men dominate: in trading, fund management, and in the financial whizz-kid activities such as developing derivatives and securities. In the US, about 10% of fund managers are women while only 3% of managers of hedge funds are women (NCRW, 2009). These vertical and horizontal forms of gender segmentation in the financial sector follow the stereotype gender

¹ I am grateful for useful comments by Ricardo Crespo, conference participants of the annual economics department conference of the University of the Basque Country in Bilbao, June 2011, and conference participants of the heterodox economics conference in Nottingham, July 2011, and participants of the public discussion on banking culture in The Netherlands organized by The Sustainable Finance Lab in Utrecht, October 2011.

segregation lines in other sectors of the economy: the glass ceiling for top positions in any sector and the feminization of service jobs and other jobs in which communication and human interaction is important, such as in education and health care. The explanations for the segmentation in finance are similar to those of gender-segmentation in other sectors: old boy's networks, the gender division of labour in the household making women more responsible for housework and childcare than men, career breaks due to pregnancy and maternal leave, and prejudice against female leadership qualities and financial skills (NCRW, 2009). What makes finance an even more male-dominated sector than other sectors will be clarified with the analysis of the LSH in the remainder of this paper.

This requires one important note, however, namely that the women who work in the finance industry are self-selected into a men's world, in which stereotype masculine characteristics are highly valued. Hence, it is likely that most of the women in the top of banks, funds, and regulatory bodies have been socialized into attitudes that we find on average more with men than with women, and that they are professionals who like the abstract, risky, and highly rewarded tasks of financial decision making. This self-selection mechanism does not support the LSH but instead makes it more likely that women who choose to work in finance behave on average more like men, in particular like men choosing a profession in finance².

2 An exploratory survey among Dutch financial professionals

The dataset contains survey information of 111 financial professionals in the Netherlands, of which 74 (66.7%) women and 37 (33.3%) men. The online survey was carried out in the period December 2010-January 2011, using NetQ. The data were analysed using SPSS with Pearson's Chi square tests for testing male-female differences. The sample size as well as the sex ratio is not representative for the financial sector in the Netherlands. The reason is that the sample was drawn through an online survey posted on LinkedIn, using the snowball method starting from a women financial professionals' network, which showed interest in the survey. The results should therefore be interpreted as exploratory. The value of the survey lies in the exploration of the implied LSH differences in attitudes and views of financial behaviour and governance between men and women during the financial crisis. Before going into the three LSH dimensions, I will first give the descriptive statistics on the basic characteristics of the male and female participants of the survey.

² I found only one paper that did an empirical test of the LSH. It compares female and male investors in online peer-to-peer lending and does not find statistically significant differences in risk and portfolio performance (Barasinska, 2010). On the other hand, a study with a more limited scope, testing for gender differences among fund managers, rejects the null hypothesis of no statistically significant gender differences – the authors argue that women in finance do behave differently from men in some, though not all, behavioural aspects, despite the self-selection mechanism. (Beckmann and Menkhoff, 2008).

Table 1 shows that men are older than women on average, and the difference is statistically significant. Obviously, this difference is likely to contribute to a gender difference in income and bonuses. The education variable indicates that women are higher educated than men, because a much larger proportion of them has obtained an MA degree (but less a PhD degree), as can be seen in table 2. The difference, however, is not statistically significant. Table 3 shows, as expected from the data summarized in the previous two tables that men earn more than women, and the difference is statistically significant. Tables 4 and 5 show the cross tabulation for sex and bonuses before and after the crisis. Interestingly, the relationship was not statistically significant before the crisis but has become statistically significant after the crisis. Men earn higher bonuses than women and even more so after the crisis. Moreover, with the enormous losses in the financial sector during the crisis, men have succeeded better in keeping their bonuses than women. So, with more scarcity of resources available for bonuses, gender seems to matter for who manages to get a bonus.

TABLE 1
Age differences between men and women (%)

	21-30 years	31-40 years	41-50 years	51-60 years	61-+ years	Total
Female	6.8	47.3	37.8	8.1	0	100
Male	2.7	43.2	27.0	24.3	2.7	100
Total	5.4	45.9	34.2	13.5	0.9	100

Pearson Chi Square test is statistically significant at the 10% level.

TABLE 2
Educational differences between men and women (%)

	Highschool	Specialised training	BA	MA	PhD	Total
Female	2.7	9.5	13.5	63.5	10.8	100
Male	5.4	13.5	16.2	48.6	16.2	100
Total	3.6	10.8	14.4	58.6	12.6	100

Pearson Chi Square test is not statistically significant.

TABLE 3
Income differences between men and women in euro per month (%)

	< 5,000	5,000 – 10,000	10,000 – 15,000	15,000 – 20,000	20,000 >	Total
Female	24.3	59.5	12.2	0.0	4.1	100
Male	21.6	37.8	21.6	5.4	13.5	100
Total	23.4	52.3	15.3	1.8	7.2	100

Pearson Chi Square test is statistically significant at the 5% level.

TABLE 4
Differences in bonus between men and women in euro in 2007 (%)

	No bonus	< 10,000	10,000 – 100,000	100,000 – 500,000	Total
Female	32.4	36.5	29.7	1.4	100
Male	27.0	29.7	37.8	5.4	100
Total	30.6	34.2	32.4	2.7	100

Pearson Chi Square test is not statistically significant.

TABLE 5
Differences in bonus between men and women in euro in 2009 (%)

	No bonus	< 10,000	10,000 – 100,000	100,000 – 500,000	Total
Female	48.6	31.1	18.9	1.4	100
Male	35.1	21.6	40.5	2.7	100
Total	44.1	27.9	26.1	1.8	100

Pearson Chi Square test is statistically significant at the 10% level.

3 LSH dimension one: risk attitude

During the crisis but also well before it broke out, women fund managers in the US have performed better than their male colleagues (Chang, 2010). Chang refers to an internal study done by AsiaHedge concluding that female fund managers in the AsiaHedge Composite Index scored 73% better than their male colleagues between 2000 and 2007, and a report by Hedge Fund Research showing that women performed 56% better than men in the period 2000 until May 2009, whereas during the height of the crisis in the second half of 2008, men lost twice as much as women. A recent study on mutual fund management in Egypt shows that women perform better than men in an emerging market (Ahmed Azmi, 2008). A study among 649 fund managers in four countries confirms that women are more risk averse than men (Beckmann and Menkhoff, 2008). A large study on gender differences in the mutual funds industry in the US does not find statistically significance performance

differences, but it does show that female fund managers follow more stable investment styles and show a higher performance persistence (Niessen and Ruenzi, 2005). Linked to this, a recent survey by a major UK investment bank, among 2000 wealthy clients in twenty countries showed not only that women invest more risk averse, but also that they place more importance on financial discipline than men (Barclays Wealth, 2011).

These gender differences in financial performance are supported by many studies on risk in experimental economics, showing that on average women take less risk than men (see for an in-depth review of experimental research on gender and risk: Croson and Gneezy, 2009)³. As a consequence, under conditions of high volatility women perform better than men because they take lower risk or take more time to study risks or include a wider variety of risk factors than men do. Whereas under conditions of relative stability of financial markets men would perform better than women, although this is not necessarily the case (see for example van den Bos, Harteveld and Stoop, 2009). A famous study by Barber and Odean (2001) using survey data from 35,000 US households on their portfolio investment behaviour, has shown that women performed even better under normal conditions of financial markets, controlling for risk diversification in portfolio choice. Men traded 45% more often than women, who tried less to beat the market, which prevented them from unnecessary and costly trading. Hence, women's transaction costs were lower, leading to higher net returns on investment. In couples, men's returns were 1.4 percent lower, whereas comparing the behaviour of singles, men earned 2.3 percent less in returns. This finding on less trading by women was recently confirmed in a survey among 2,000 wealthy individuals (Barclays Wealth, 2011). This report also indicated that women use partly different strategies of financial discipline than men: they more often use cooling-off periods and they more often avoid information about markets that may lead to deviate them from their long term strategies. Hence, women seem to be less over-confident than men in their investment behaviour.

Moreover, women seem to behave more contextually. A survey among fund managers found that women change their strategy more often when they

³ A recent report by the Deutsche Bundesbank on gender and age composition in boards of banks finds that banks increase their levels of risk when there are more women on the board (Berger, Kick and Schaeck, 2012). This contradicts the findings of most empirical and experimental research on gender and risk attitudes. The report does not give an explanation for its findings but admits that there may be a relationship with age and experience for which it did not control. I suggest that the result may well be a consequence of men's reaction to the entry of women in boards. They may exhibit typical macho behaviour, signalling to the women that they are 'real men', increasing their levels of risk. This potential explanation is supported by a recent study with data from online chess playing with 15,000 players and 1.4 million games and 15% women. It found that when men play against women, they choose more aggressive strategies, even though such strategies reduce their winning probability (Gerdes and Gränsmark, 2010). Further analysis into male reactions to women entering a male domain is necessary before any conclusions can be drawn on whether a change in risk profile of a bank is driven by an increase in women on the board or by an over-reaction of the males on those boards to the entry of women in a traditionally all-male domain.

are ahead of or behind the market – “they try to perform closer to the market development than men” (Beckmann and Menkhoff, 2008: 377). A study on pension fund investment indicates that women tend to diversify their portfolio slightly more than men, and are less likely to sell when markets are down (Vanguard, 2011). However, in a study using a large database on chess playing, it was found that men adapt their strategy when playing against women, whereas women do not (Gerdes and Gränsmark, 2010). Apparently, men are more sensitive to a gender difference between players than women. Men appear to play a more aggressive strategy when playing against women, and this effect is even stronger when a male player is on objective grounds (measured with the so called Elo rating) weaker than a female player. This reaction to women by male players reduces their winning probabilities, controlling for various other factors: a solid strategy has a 1.5 percentage point higher probability of winning as compared to an aggressive strategy, a difference which is statistically significant. Again, this points at over-confidence among males in risky, strategic settings.

Another type of empirical literature that is interesting in this respect comes from experimental social psychology, indicating that abstract thinking increases one’s sense of power (Smith, Wigboldus and Dijksterhuis, 2008). This ties in with a study in psychoanalytics, arguing that financial assets tend to be regarded as ‘phantastic objects’, leading traders to ignore risks (Tuckett and Taffler, 2008). When markets move upwards, this unconscious belief in a mental representation of something that fulfils the trader’s deepest desires to have what he wants and when he wants it, “leads to a growing excitement and a belief in a more and more contagious new reality (idem, p. 406)”. The authors explain that “when the bubble bursts this is not due to new information; rather it seems the dizzy heights reached create an accumulation of split-off anxiety” (ibid.). The authors also suggest that this psychoanalytical approach helps to explain why anger and blame rather than guilt erupt in the aftermath of the crisis.

During the heights of the financial crisis it are the jobs that require most abstract thinking – trading, modelling, and developing derivatives – that appeared to be the most harmful, expressing excessive risk. And it is precisely those jobs that are the most powerful as they provide the opportunity to gain huge bonuses and to attain prestige – and they are least occupied by women⁴. When women fund managers were asked to reflect on the differences between their and their male colleagues’ strategies when the crisis broke out, they often replied that the men either just waited for the storm to get over or they kept on

⁴ In May 2012, JP Morgan Chase revealed that one of its traders in London, with the nickname of the London Whale, had caused a loss of 2 billion dollar, not through fraud but within the bank’s rules and oversight regulations. The Chief Investment Officer under whom this trader works, Ina Drew, a woman known for her risk aversion, resigned as a consequence. On the other hand, there were a few women involved in the creation and evaluation of toxic assets. TIME features a list of the 25 people who are to blame for the crisis, which includes two women, Kathleen Corbet who ran the largest rating agency, Standard & Poor’s during most of the years preceding the crisis, and Marion Sandler who, together with her husband Herb Sandler were the first to offer tricky home loans back in the 1980s.

trading as before, whereas the women spent more time on research before they would take a decision (NCRW, 2009).

The findings reviewed above are not necessarily driven by nature – these are precisely the key features of the investment strategy of Warren Buffet, portrayed recently in a book under the title *Warren Buffett Invests Like a Girl – and Why You Should, Too* (Lofton, 2011)⁵. Indeed, it is not only experimental economists and other academics who come up with gender differences in financial behaviour. The financial sector itself is increasingly aware of these differences, though only very slowly following up on these, with the top of the sector protecting its interests by keeping the circle of hiring and promotion largely within the old boys’ network⁶. The nurture explanation suggests that women’s socialization into societal norms about proper behaviour for women as compared to men leads them to take lower risks, to have more self-constraint, and to react more contextually to changes in the market. This is supported by a recent study by Booth and Nolen (2012) who found that girls in single-sex schools exhibit the same levels of risk in games as boys, whereas girls in coed schools take lower risk levels. “Adolescent females, even those endowed with an intrinsic propensity to make riskier choices, may be discouraged from doing so because they are inhibited by culturally driven norms and beliefs about the appropriate mode of female behaviour – avoiding risk. But once they are placed in an all-female environment, this inhibition is reduced. No longer reminded of their own gender identity and society’s norms, they find it easier to make riskier choices than women who are placed in a coed class (idem, p. F74)”.

The nature dimension finds support in the empirical literature too. This has been analysed in particular in neuroeconomics. A key study is among 17 male London City traders, testing for the relationship between two hormones, testosterone and cortisol, on the one hand and financial decision making and returns on the other hand (Coates and Herbert, 2008, and for a more general interpretation see Coates, Gurnell and Saranyai, 2010). Testosterone is known in the literature for the ‘winner effect’, because it increases confidence and risk taking. Cortisol is sensitive to situations of uncontrollability and uncertainty, while it also affects the immune system. The traders traded in many assets but mostly in German interest rate futures, closing their trades at the end of the day, and were followed for eight consecutive business days. Saliva samples were taken twice a day (at 11 am and 4 pm) and profits and losses were recorded at the same time. The study found that daily testosterone was significantly higher when they made above average profits. Also, on days of higher morning testosterone levels, traders made higher profits for the rest of the day than on lower testosterone days. The authors conclude that “because

⁵ Lofton gives the following three-point advise to investors based on Buffett’s experience and attitude: (1) Value and cultivate your relationships with people (2) Learn from the masters, but be willing to question them (3) Be fair and operate in an ethical manner.

⁶ An interesting example of a sector response to the insight of higher female financial performance is a new private equity fund set up by three women in the Netherlands, Karmijn Kapitaal, investing only in medium scale firms that have women on the board. See: <http://www.karmijnkapitaal.nl/en/>

the days of high 11 am testosterone were different for each trader, thereby ruling out any general market effects on both testosterone and profits and losses, our results suggest that high morning testosterone predicts greater profitability for the rest of that day” (Coates and Herbert, 2008, p. 6168). On cortisol, the study found that the more volatile a trader’s profits and losses, the higher were his average daily cortisol levels as well as the standard deviation in cortisol. This suggests, according to the authors, “that individual levels of cortisol relate not to the rate of economic return, as does testosterone, but to the variance of return” (idem, p. 6169). Cortisol rose in 38% of the subjects’ days, sometimes up to 500%. Also, cortisol correlated strongly and positively with the volatility of the interest rate of the German Bund, while testosterone did not. The authors signal potential negative effects for financial markets from their findings. First, when testosterone is chronically elevated, the literature indicates that it no longer has positive effects, but instead increases impulsivity and harmful risk taking, as well as euphoria and mania, and becomes addictive. This may exaggerate a market’s upward movement. Second, chronically elevated levels of cortisol stimulate anxiety and a tendency to find threat and risk where none exist, which may exaggerate a market’s downward movement. Together, the behavioural effects of these hormones may strengthen market volatility, and “help explain why people caught up in bubbles and crashes often find it difficult to make rational choices” (idem, p. 6171).

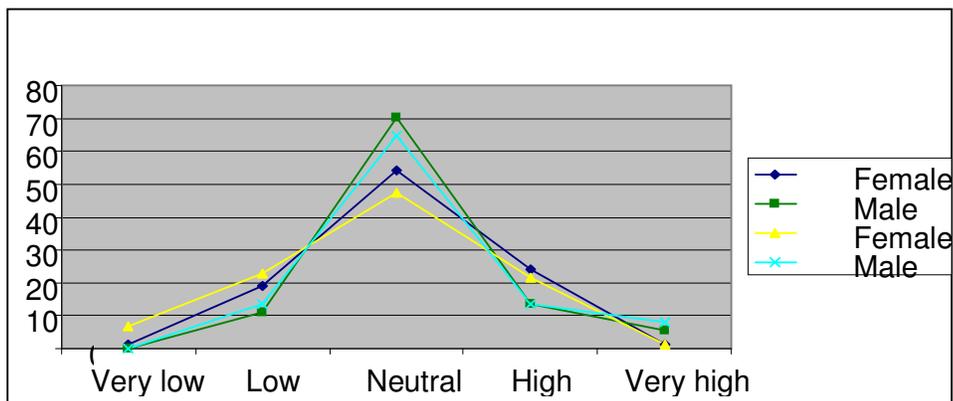
The mentioning of ‘people’ in the last quote is interesting, given the fact that the sample only contains males. It may well be, of course, that women would express similar behavioural reactions to similar levels and changes in the two hormones. But the fact is that women’s testosterone levels are much lower than men’s, whereas, even though their cortisol levels are similar, women’s bodies react much more to higher cortisol levels with the secretion of the hormone oxytocin than men’s bodies, a hormone that counters the production of cortisol and promotes nurturing and relaxing emotions (Nazario, n.d.). A study on oxytocin and altruism, among a double-blind placebo-controlled sample of 96 male students in a public goods game has shown that receiving oxytocin (through a nose spray) is positively correlated with the willingness to cooperate and the expectation that others will cooperate (Israel et. al, 2012). This suggests that oxytocin indeed may have positive economic effects in a context of uncertainty, stress and anxiety-based herd behaviour. In line with these findings, a review article on the neurological foundations of economic choice concludes that the cognitive control processed by the dorsolateral pre-frontal cortex of the brain is impaired during stress and depleted with repeated use (Fehr and Rangel, 2011). The authors conclude that “this predicts that subjects are more likely to make short-sighted decisions under stress” (idem, p. 24). So, in order to reduce increasing risk levels and market volatility in financial markets, a better gender-balance on trading floors seems meaningful, both physically by replacing some male traders with female traders, and chemically, by administering oxytocin to male traders when market volatility increases ...

The survey among Dutch financial professionals asked first about the subjective risk level respondents take before and after the crisis. Diagram 1 below shows that more men take very high risk and more women take very low risk, with the gender difference becoming stronger after the crisis. This

result confirms the findings in the empirical literature on gender differences in risk taking, as was also discussed above. But there is more to the gender difference in risk attitudes. The diagram also shows that men more often take neutral risk levels, before and after the crisis, whereas more women take high and low risks, before and after the crisis. In other words, women express a higher spread of risk, whereas men opt more often for a less context-specific, default risk level or a very high risk category. The gender differences are statistically significant for the data after the crisis, not before. So, with more volatility in the financial market, women adjust their risk attitude more than men. However, when asked whether they adjust their risk levels when markets become volatile, both men and women respond that they adjust risk levels downwards, men claim to do so more often than women state this, as table 6 indicates, although the gender difference is not statistically significant. Men apparently overstate their risk aversion during a crisis. A similar effect of overstatement that has been demonstrated in hypothetical public goods games versus real games. Brown and Taylor (2000) found in such an experimental setting that men overstate their contributions in a hypothetical public goods game three times more than women. Apparently, men not only show overconfidence in their risk attitude but also they do not seem to be aware of this.

The conclusion from the gender analysis of behavioural strategies in relation to risk attitudes is that in this sample of Dutch financial professionals, women are slightly more risk averse than men. Moreover, men state, to a similar extent as women, that they adjust their risk levels downward during a crisis, but women appear to do that more in practice, and show a higher spread of actual risk profiles. This suggests more contextual risk behaviour by women as compared to men and more overconfidence among men, who do not seem to be aware of this. Both findings are consistent with the empirical literature reviewed above, but need further exploration beyond this exploratory survey.

DIAGRAM 1
Risk taking before and after the crisis (%)



Pearson Chi Square test is not statistically significant for 2007,
but is statistically significant at the 10% level for 2009.

TABLE 6
Downward risk adjustment in volatile markets (%)

	Yes	No	Total
Female	62.2	37.8	100
Male	70.3	29.7	100
Total	64.9	35.1	100

Pearson Chi Square test is not statistically significant.

4 LHS dimension two: rules & responsibility

Experimental game theory has consistently shown that women are more cooperative than men (Croson and Gneezy, 2009). This has been shown with well-known games that test for attitudes that have a combined moral as well as social dimensions, such as the dictator game, the ultimatum game, the prisoner’s dilemma and the public good game. Moreover, varying game conditions such as a change in the members of the group or information about players, appear to have more effect on women’s strategies than on men’s strategies. This suggests that women’s reasoning in complex situations is more contextual than men’s. Such contextual reasoning in complex social settings, involving ethical implications, is a major characteristic of the ethics of care, developed by Caroll Gilligan. Indeed, Croson and Gneezy (2009: 464) conclude: “we believe, as suggested by Gilligan (1982), that men’s decisions are less context-specific than women’s.”

The ethics of care is attentive to the inter-personal level, where ethics is concerned with sustaining human relationships and preventing harm to others (Waerness 2009). In the financial sector this can be done, for example, by recognizing the limited financial means of some people, recognizing risks that individuals, families or firms run, or recognizing how certain institutions that emerged, like systems of reward, may tempt people to behave irresponsibly in the knowledge that this will not be punished. Context, then, refers to livelihood, risk, and perverse incentives. In the ethics of care, preventing harm to others is contextualized and requires taking responsibility for the consequences of one’s actions. Not only as an individual but also through institutions, and responsibility for preventing the system in which one functions to turn into an uncontrollable chaos causing harm to all involved. Hence, put in this frame, the ethics of care can be used to analyse the financial system and banks operating in that system.

There is only very limited empirical literature testing for gender differences in moral behaviour in firms (see, for a few studies, Robinson et. al, 2000; Dreber and Johannesson, 2008). However, a recent experimental study with 96 MBA students (33% female) on buyer-seller information asymmetry has done a revealing test for understanding gender differences in ethical behaviour before the outbreak of the financial crisis (Kray and Haselhuhn, 2011). The study finds that male participants more often identify with the interests of a buyer or a seller, changing their attitude towards sharing of asymmetric information, depending on whether they were assigned the sellers role or the buyers role. Female participants more often identify with what they consider to be a fair

relationship between buyer and seller, i.e. revealing asymmetric information, irrespective whether they take the buyer's role or the seller's role. The differences were found to be statistically significant and indicate that women's ethical attitude in a market relationship is more cooperative and oriented towards 'fair play', whereas men's ethical attitude is more competitive and oriented towards protecting the interests of the market side that they represent. These results have led the authors to test a variant of the LSH: "We began by asking whether a hypothetical Bernadette Madoff would have committed the same infamously unethical actions as the real Bernie. The current research suggests not and importantly, offers an explanation as to why not. Though men and women may share common social and achievement motivations, they appear to differ in the extent to which their experiences and beliefs are called upon to set ethical standards. By relying more heavily on their motivations, men derive considerable leeway in setting ethical standards, rendering them more vulnerable to ethical lapses" (Kray and Haselhuhn, 2011, p. 12). So, the literature indicates that women are not only, on average, more cooperative than men, they also let their behaviour be guided more by what they perceive as morally good in relation to particular others in a particular context as compared to men. This suggests that women would be more than men inclined towards responsible behaviour when relationships with others are involved.

Turning to the exploratory survey results, I find that more men (24.3%) than women (10.8%) place high trust in the effectiveness of regulation, and for national regulation the gender difference is statistically significant (see Table 7). This relates to the gender differences in ethical reasoning referred to in the literature: whereas women tend to place more trust in a personal, contextual ethics, men tend to place more trust in an abstract, universal ethics, as is expressed by Central Bank regulation.

TABLE 7
Do you think more national regulation helps to prevent a crisis? (%)

	Somewhat	Strongly	Total
Female	89.2	10.8	100
Male	75.7	24.3	100
Total	84.7	15.3	100

Pearson Chi Square test is statistically significant at the 10% level.

There is a stark contrast in the answers by men and women to the question whether Dutch banks have become too big to fail, as table 8 shows. The three top Dutch banks (ABN Amro, ING, and Rabobank) each have a balance total higher than Dutch GDP. One of these received much state support and another one was nationalized. The majority of men agree that these banks have become too big to fail, whereas the majority of women disagree (see Table 8). The interpretation of the gender difference is not straightforward. Perhaps women see no problem in TBTF in the abstract, but trust that responsible behaviour by any bank, big or small, will help to prevent problems.

TABLE 8
Have Dutch banks become too big to fail? (%)

	Yes	No	Total
Female	45.9	54.1	100
Male	64.9	35.1	100
Total	52.3	47.7	100

Pearson Chi Square test is statistically significant at the 10% level.

The two diagrams below show the answers to two questions that directly concern responsibility. A clear majority of women (61%) feel that their bosses should have acted more responsibly before the crisis, against nearly half of the men (49%). When asked about their own failures, the respondents show less responsibility. Women, however, feel more responsible than men, 27% versus 22%. The gender differences in these responses support the findings in the literature, indicating that female financial professionals are more likely than their male counterparts to weigh moral values in relationships heavier vis-à-vis their interests as sellers of financial products. The gender differences found in the responses to this survey question, however, are not statistically significant.

DIAGRAM 2
Responsibility of boss (%)

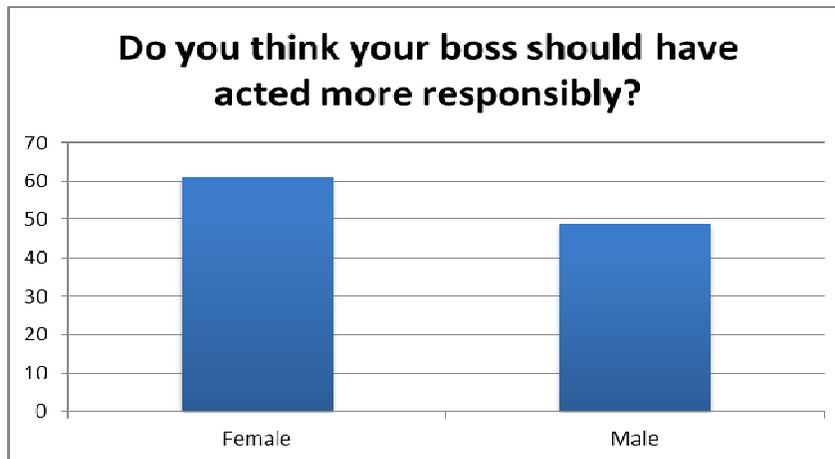
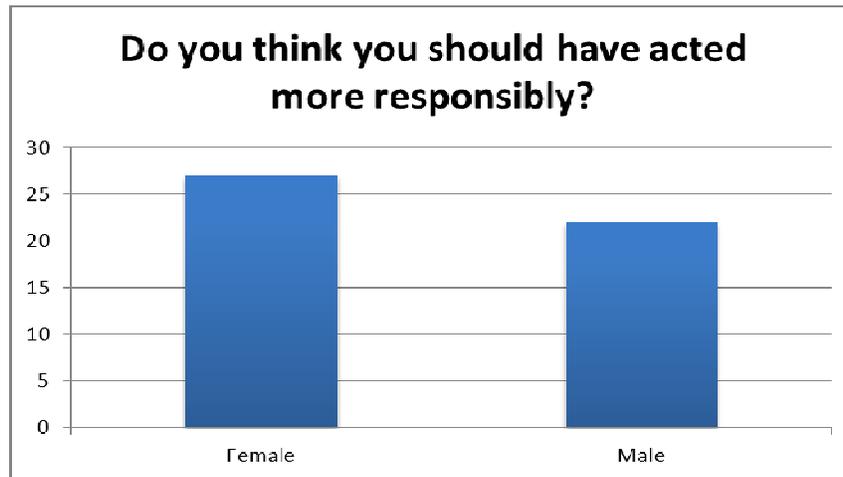


DIAGRAM 3
Responsibility of one self (%)



5 LSH dimension three: leadership

Already well before the crisis broke out we see an interesting gender issue concerning well-known whistle blowers. In 1997 it was Brooksley Born, chair of the US Commodity Futures Trading Commission who called Congress for derivatives regulation (Chang, 2010). Her voice, however, was silenced while increasingly non-transparent and complex derivatives and securities were being developed. In 2006 it was Sheila Bair, chair of the US Federal Deposit Insurance Corporation, who warned against nonperforming mortgages (*idem*). Also she was ignored. Again in 2006, Madelyn Antoncic, risk manager at Lehman Brothers, warned against too high risk levels taken in her bank. She was side-lined, just a year before the bank collapsed (The Economist, 2010). Male whistle blowers were also ignored, but they were further away from the fire, they were academics, such as Steve Keen and Nouriel Roubini⁷. But it is striking to see that the three women who gave serious warnings and called for change had top positions within the financial sector, they were insiders, and yet they were ignored or pushed aside.

Women are scarce in leadership positions everywhere, and even more so in finance. The explanations for this under-representation include gender stereotypes about power and leadership, which prevent women from reaching top positions (Ridgeway, 2001; van Vianen and Fischer, 2002; Acker, 2006; Ely and Padavic, 2007). Moreover, such stereotyping also tends to make it hard to earn respect and to remain at the top, as Joan Acker (2006: 447) explains: “women enacting power violate conventions of relative subordination to men”. After the crisis broke out, however, we see several financial leadership

⁷ Keen and Roubini have won the Revere Award for being economists who have publicly warned for the crisis. <http://rwer.wordpress.com/2010/05/13/keen-roubini-and-baker-win-revere-award-for-economics-2/>

positions being filled with women. We now have female Ministers of Finance in Spain, a female Central Bank President in Iceland and female CEOs of Iceland's main banks, as well as in various other countries, while in the US, Mary Schapiro was appointed chair of the SEC (Securities and Exchange Commission) and the president of the IMF is a woman, Christine Lagarde, for the first time since the organization's existence.

But the fact that we see now women cleaning up the mess that men left behind, may not only be a sign of an acknowledgement of women's better performance in financial leadership, but also a reflection of the hope that they will bring the situation back to normal, which may then lead to replacement of these women by men and their business as usual. The economic literature has an explanation for this phenomenon, namely the glass cliff: in times of high uncertainty, women get more often the chance to take up a top position than in normal times, precisely because of the risk of failure under volatile circumstances. Cleaning up a mess is certainly an expression of caring – mending the web of relations as the ethics of care scholar Joan Tronto (1993) would say. But it may not serve the women themselves, after the job is done and the sector is back on track – it is relatively easy to find a reason to push these women over the cliff, since they had to fire and punish some of their (largely male) subordinates. It may well be that when financial markets stabilize the old boys' network will tighten around them as before. Literature on the glass cliff precisely points at this to happen when women are appointed in top positions that are fragile. Interestingly, this phenomenon was also found during a financial downturn in an empirical study by Ryan and Haslam, (2005). They compared firms listed at the London Stock Exchange with higher ratios of women in the board with firms that had fewer women on boards. They found that “in a time of a general financial downturn in the stock market, companies that appointed a woman had experienced consistently poor performance in the months preceding the appointment” (Ryan and Haslam, 2005: 86). They conclude that “such women can be seen to be placed on top of a ‘glass cliff’, in the sense that their leadership appointments are made in problematic organizational circumstances and hence are more precarious” (ibid p. 87).

The empirical management literature on women and leadership indicates that women are not worse leaders than men. McKinsey & Company (2007) have shown that of 89 European listed companies firms with more women on the board had better financial performance than firms with less women in executive boards. Good management decisions are complex and therefore require a diverse team to take all relevant factors into account, as has been recognized in the law of requisite variety (Ashby, 1958)⁸. A recent study using assessments of over 7,000 managers and executives from successful companies worldwide, of which 36% was female, found that in the majority of areas

⁸ This law states that high variation in context can only be adequately dealt with through high variation in decision making. Or, more formally, the larger the variety of actions available to a control system, the larger the variety of perturbations it is able to compensate. This implies that in volatile environments such as financial markets diverse management teams would be better equipped to deal with crises and their prevention than homogeneous teams.

women were higher rated than men, including in finance and accounting (Zenger and Folkman, 2012). The ratings were constructed on the basis of, on average, 13 respondents, such as managers and peers. When disaggregating leadership performance into 16 leadership competences, female leaders were statistically significantly rated better in 12 of these than men. For example, they scored higher on the following detailed survey items: “follow through on commitments”, “willingly goes above and beyond”, “improves based on feedback from others”. Interestingly, the gender differences in leadership competences do not, at first sight, reflect gender stereotypes about leadership – they score statistically significantly better on 75% of the items, most of which are not typically regarded as feminine. For example, the biggest male-female differences were found in the competences of “Takes Initiative” and “Drives for Results”, which are commonly seen as masculine characteristics rather than feminine ones. Female leaders also scored much higher on the only explicit ethical competence that was included, namely “Displays High Integrity and Honesty”, as well as on relational dimensions involving ethics, namely “Develops Others” and “Builds Relationships”. The only competence in which male leaders were rated statistically significantly higher was “Develops Strategic Perspective”.

These findings can be interpreted tentatively in the light of the findings reviewed earlier in this paper. The gender differences do not reflect common stereotypes about masculinity and femininity, but rather seem to relate to the distinction between contextual ethics, concerned with relationships, flexibility, fort-righteousness, and self-discipline, that was found to be more related to women than to men in the empirical literature and the exploratory survey results. This interpretation receives support from another empirical study of over 13,000 managers (27% female) who were rated by 64,000 subordinates (van Emmerik et. al, 2008). The study clustered a wide variety of leadership characteristics into two stereotypical categories, namely ‘consideration’, generally regarded as feminine, and ‘initiating’, generally regarded as masculine. The two leadership styles were negatively correlated. Interestingly, the authors found that both types of leadership behaviours are more strongly expressed by female leaders than by male leaders. The authors conclude therefore that “Female managers worldwide combine ‘soft’ with ‘hard’ leadership behaviours. One might speculate that female managers actually do a better job worldwide, as they deploy both more consideration and more initiating structure” (idem, p, 310).

The findings reviewed above do raise the question to what extent an increase in female leadership in the financial sector is supported by those who work in the sector. The survey included two questions on this issue.

Tables 9 and 10 show large differences between male and female respondents in support for women in financial top positions. Both men and women agree that more women should be hired at the financial top when they have equal education and experience, but women agree more than men. Only half of the men think that more female leadership would help to prevent a next crisis, whereas the large majority of women agrees that this would be the case. Apparently, men do not see much benefit of gender diversity in leadership in the financial sector, or they fear for their own careers.

TABLE 9
Should more women be hired at the financial top*? (%)

	Yes	No	Total
Female	97.3	2.7	100
Male	81.1	18.9	100
Total	91.9	8.1	100

Pearson Chi Square test is statistically significant at the 1% level.

* Note: the question included the addition "when they have the same level of education and experience as men".

TABLE 10
Would more female leadership prevent a next crisis? (%)

	Yes	No	Total
Female	86.5	13.5	100
Male	51.4	48.6	100
Total	74.8	25.2	100

Pearson Chi Square test is statistically significant at the 1% level.

A recent paper by Lyda Bigelow et. al (2012) analysed whether investors have equal confidence in female and male CEOs. The experimental set-up among 222 MBA students used hypothetical descriptions of CEOs that only differed in the sex of the CEO. The experiment has shown that "despite being identical in the experiment, the abilities and experience of female CEOs were evaluated more negatively than those of male CEOs (p. 20)." The authors suggest that the market does not see gender diversity in top management as a predictor of potentially better performance due to gender-biased perceptions about female leadership.

In conclusion, it seems that among business administration students and professionals in the financial sector gender stereotypes about female managers' capacities are stronger than the actual ratings of female managers' performance, which helps to explain the strength of the glass ceiling in finance, as well as the phenomenon of the glass cliff during the financial crisis and its aftermath.

7 Conclusion

The Lehman Sisters Hypothesis has received strong symbolic meaning in debates on the behavioural dimensions behind the financial crisis. My analysis of the empirical literature on gender differences in risk attitudes, rules and responsibility, and leadership, combined with the findings of an exploratory survey among financial professionals, finds empirical support for the hypothesis. Women were found to be more risk averse, less overconfident with less inclination to beat the market, and applying a wider range of strategies in risky situations including more self-discipline. Moreover, women and men react in a stereotypical way when they need to make decisions in a context with

the other sex present or as opponent: men take higher risks whereas women act more risk averse than they would do in a same-sex context. In addition, men's higher testosterone levels and women's higher oxytocin response to the stress hormone cortisol help to explain why male-dominated trading floors may exacerbate market volatility, whereas female investors of hedge funds, wealth management and household portfolios earn higher returns on investment than their male counterparts. The literature and survey results also indicated that women act more contextual in complex situations, and are less supportive of universal rules, such as regulation of the financial sector. This contextual reasoning by women also has moral dimensions, namely a stronger focus on responsibility in relationships as compared to adhering to self-interest. Finally, the recent empirical literature on gender and leadership shows that the phenomena of the glass ceiling and the glass cliff still operate, despite the fact that female leaders are evaluated more positively than male leaders. Also here, gender stereotypes play a role. When same-quality male and female leaders were compared in hypothetical situations, female leaders were undervalued, but when actual managers' skills were rated, the female leaders came out as better leaders. This was found to be caused by a better balance between 'hard' and 'soft' skills among female leaders. Apparently, leadership is still connected with what people believe to be masculine values, and hence, more connected with men. This gendered belief, together with other factors such as the protection of their careers by male financial professionals, most likely limits the support among males for female leadership in the financial sector.

This brings me to a last issue raised by the literature review, namely the nature-nurture debate. The empirical literature reviewed above indicates that both nature and nurture affect gender differences in risk attitudes, cooperation, responsibility, and leadership. Interestingly, recent literature on these mechanisms increasingly suggests that nature and nurture are not independent but related (Taylor, 2001; Roughgarden, 2004). Shelley Taylor (2001) has brought together research into the linkages between sociology, biology, and psychology, among humans as well as among primates, arguing that women tend to have stronger caring bonds than men. Women have more and closer friendships, indicating that sympathy may, on average, be a stronger trait among women than among men, which is most likely generated by a combination of nature and nurture, Taylor argues. Women's groups are generally horizontally organized as supportive networks, which cooperate for food and childcare. Men's groups are generally threatened by power plays because they are organized as hierarchies, which facilitates defence, attack and hunting. This helps to understand why men's moral goals are more often related to showing competences, including taking higher risk and showing more aggression, whereas women's moral goals are more often related to affirming relatedness, implying self-discipline and responsibility. Obviously these are crude generalizations and mere group averages, just like the average sex differences in height or brain size. The combined insights from both the social sciences and the natural sciences make the variations found in financial behaviour between men and women more understandable, I think, than limiting explanations to either nature or nurture – in particular because the two are most likely related.

In conclusion, the Lehman Sisters Hypothesis clearly finds support in the empirical literature on the three main behavioural dimensions behind the hypothesis and in the findings from the explorative survey among Dutch financial professionals. But further research is necessary, in particular on the ethical dimensions, the interaction effects between males and females, the constraints for women leaders in banking, and underlying this all, the nature-nurture interrelatedness of the behavioural economic and neuroeconomic findings. The Lehman Sisters Hypothesis has set an exciting research agenda for pluralist economists and I invite you all to join me in this challenging endeavour.

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