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The Lehman Sisters Hypothesis

Abstract

This article explores the Lehman Sisters Hypothesis. It reviews empirical literature about gender differences in behavioral, experimental, and neuro-economics as well as in other fields of behavioral research. It discusses gender differences along three dimensions of financial behavior: risk aversion and response to uncertainty, ethics and moral attitude, and leadership. The article argues that gender stereotypes are influential in finance, constraining women to achieve top positions in banking and sustaining a strong masculine culture. At the same time, the analysis indicates that the few women who make it to the top tend to perform on average better than men, in particular under uncertainty. This is explained by a combination of gender beliefs, gender stereotypes, gender identity, and flexible biological processes. Although further research is necessary, the existing empirical literature would support a plea for having more rather than less women in financial trade, risk management, and at the top of the financial sector.

Introduction

When the financial crisis broke out with the fall of Lehman Brothers in 2008, some commentators drew attention to the behavioral aspects of bankers. One way in which this was done was by suggesting that it is particularly masculine behavior, largely exhibited by male bankers, that is responsible for the high-risk-lobby-for-less-regulation-perverse-incentive behavioral nexus behind the crisis. EU commissioners

Neelie Kroes and Viviane Reding as well as former UK Minister Harriet Harman and IMF director Christine Lagarde have phrased this masculine behavioral nexus as the Lehman Sisters claim. This claim suggests that with more women in the top of banking, we would not have had this deep crisis. In this paper, I will analyze this claim as the Lehman Sisters Hypothesis.

In order to do this, I need to break down the Lehman Sisters Hypothesis (LSH) into the major dimensions of financial behavior where gender differences seem to matter. The very diverse literature on behavioral differences between men and women, covering economics and the other social sciences, the humanities, as well as biology and neuroscience, suggests three key dimensions of gender differences in financial behavior. These are risk aversion and response to uncertainty, ethics and moral attitudes, and leadership. When zooming in on behavioral differences between men and women, we need to bear in mind that often, such differences are small, also when they are reported to be statistically significant (Nelson, 2012). And it is important to keep in mind that the share of women in the financial sector, particularly at high-level positions, is very small. 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). 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 financial services 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, risk management, and in the financial whizz-kid activities such as developing derivatives and securities. In the US, about 10% of all fund managers are women while only 3% of managers of hedge funds are women (NCRW, 2009). Nevertheless, women have been playing an active role in financial investment for centuries. In the UK, for example, in the year 1840, women held 40% of governments stocks (Rutterford and Maltby, 2006).

This gender segmentation of the financial sector follows the stereotype gender segregation lines in other sectors of the economy. The glass ceiling for top positions in any sector prevents women to reach top positions at the same speed as men do. While the feminization of service jobs and other jobs in which communication and human interaction is important, such as in education and health care, find over-representations of women. The explanations for the segmentation in finance are similar to those of gender-segmentation in other sectors. They include 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 maternity leave, and prejudice against female leadership qualities (NCRW, 2009).

What makes finance an even more male-dominated sector has to do with additional prejudice about women's mathematical and financial skills and the high-testosterone culture in financial organisations. Caitlin Zaloom's (2006: 113) participatory research, as a trader on the trading floors in Chicago and London reveals "traders as hypercompetitive, masculine actors". Linda McDowell (2011) refers to hyper masculinity in her analysis of the financial crisis. Melissa Fisher's (2012) interviews with top women at Wall Street shows how women in finance are easily labeled as 'monster mothers' or challenged by sexually explicit and profane language, and eventually see their share in the top of banks reduced in the aftermath of the crisis. While Hanna Rosin (2012) has explained that the old statistic that girls score worse than boys in math tests has been defeated over time: nowadays in many countries girls score just as well as boys. Recent experimental research even suggests that they tend to score better than boys when they have overcome their dislike for competition in math contests (Niederle and Vesterlund, 2010; Cotton et al., 2013).

The strong disbalances along gender lines in the financial sector implies that the women who work there, are self-selected into a men's world, in which stereotype masculine characteristics are highly valued. Those women deal on a day-to-day basis with masculine norms and male-dominated decision making. And it is likely that they, more than the average woman, like the abstract, risky, and highly rewarded tasks of financial decision-making. This self-selection of women in finance is an important reminder for the interpretation of empirical data on gender differences. It is likely that women who choose to work in finance behave on average more like men, in particular like men choosing a profession in finance¹. This could lead to an under-estimation of gender differences in financial behavior. Hence, this may result in low support for the Lehman Sisters Hypothesis, which assumes a much wider share of women going into finance – including those who would not self-select into this sector but need persuasion to move there.

A Theoretical Framework for Gender Differences in Financial Behaviour

In order to be able to interpret the wide diversity of empirical research on gender differences in behavior relevant to finance, both from the social and the natural sciences, I have opted for a theoretical framework, which integrates both social and biological dimensions of behavioral differences between men and women (see for partial conceptual linkages between nature and nurture: Shelley Taylor, 2001; Jane Roughgarden, 2004). A comprehensive biosocial framework has recently been developed by the

psychologist Alice Eagly, based on her decades of empirical studies of gender differences in socio-economic behavior. Her biosocial constructionist framework offers an alternative to evolutionary psychology theories in which current male-female differences are attributed to the activation of pre-determined behavioral repertoires. While her framework is also an alternative to sociological theories, which reject any biological dimensions of behavior. Here, I draw on the most comprehensive presentation of her integrated framework (Wood and Eagly, 2012). The biosocial constructionist framework of gender differences in behavior consists of a vertical dimension and a horizontal dimension. The vertical dimension focuses on the long run and explains the common, but yet varied, gender division of labour across the world from two sex differences: male strength and female reproduction, as well as from economic specialization interacting with culture and the natural environment. These factors have structured sex differences into gender roles, spheres of behavior and a patriarchal system sanctioning this. This vertical dimension of Eagly's theoretical framework is best suited to explain the historical development of gender differences in structures of today's societies and historically grown gender differences between societies. Behavioral differences between men and women in today's finance practices, however, are better understood in the horizontal dimension of the framework, which focuses on gender patterns and changes therein in recent decades. The horizontal dimension starts from the ubiquitous gender division of labour in societies, in which men tend to specialize in the public sphere and women in the private sphere. This involves gender roles, "the shared beliefs that members of a society hold about women and men" (p. 70), going much further than men's advantage in strength and women's reproductive capabilities of child bearing and lactation. Gender roles include stereotypes, which center around two predominant stereotypical themes: communion (positively ascribed to women) and agency (positively ascribed to men). A recent special on women in science of *Nature* (7 March 2013, vol. 495) demonstrates how strong gender beliefs still are in modern societies, even among those working in academia and aware of the risks of such biases. In this special, Jennifer Raymond, a neurobiologist consciously giving opportunities to young women in her team, discovered through an online Implicit Association Test (referred to in the article) that even she suffers from stereotyping, leading her to the conclusion that "most of us are biased" (Raymond, 2013: 33).

Back to the stereotype association of communal characteristics with women and agentic characteristics with men in Eagly's horizontal dimension of her theoretical framework. Even though in patriarchy women have lower status than men, the positive attribution of communal characteristics to women becomes a system justifying belief to which many men and women hold on, while only some challenge this dominant belief. It should be noted here, that gender beliefs are very different from essentialism, in

which women and men are ascribed different natural traits. Behavioral gender differences are predominantly rooted in nurture, not nature: there is much variation between women and between men. A recent study has tested whether average differences that can be found in many areas of behavior are taxonomic (that is, relatively strict and pervasively belonging to either women or men in all attributes of a particular behavioral item) or placed along a continuum on which individuals can score more or less feminine/masculine per attribute, so a matter of degrees (dimensional). The authors found that the only two taxonomic traits, which differentiate men and women, are physical strength and sex-stereotyped activities listed by adolescents as their preferred activities (like playing rugby versus doing make-up) (Carothers and Reis, 2013). All other average behavioral differences between men and women appeared to be dimensional (and one ambiguous gender trait). In other words, both men and women exhibit communal and agentic behaviors, in many behavioral areas, at varying degrees per individual, with average differences between women as a group and men as a group.

The next key concept in Eagly's biosocial constructivist framework, next to gender beliefs and gender stereotypes determining gender roles, is 'gender identity'. This concerns the internalization of gender roles. "People *do gender* [emphasis in original, IvS] as they recurrently produce social behaviors stereotypical of their sex" (p. 77). Next to gender identity and gender roles, the framework includes a biological dimension. However, not as 'hard wired brains', a popular concept in evolutionary psychology, but through the much more flexible biological processes of hormones, neural systems, and cardiovascular responses. Agentic behavior is related to testosterone and cortisol, hormones that are on average more present in male bodies, while communal behavior is related to oxytocin and estrogen, which are more available in women's bodies. The relationship with gender differences occurs in two ways. Gender roles affect hormonal levels, for example, nurturing reduces testosterone levels in both men and women (Booth et al 2006). And the other way around, hormones affect behavior, for example, administered testosterone to women increases their fairness in bargaining behavior (Eisenegger et al., 2010).

In turn, these three key factors in the horizontal dimension of the biosocial constructivist framework – gender roles, gender identity and flexible biological processes – together impact upon day-to-day behavior and attitudes of men and women, often in interaction with each other. For the purposes of my study, I will rely mostly on this horizontal dimension of the theoretical framework to analyze risk aversion and response to uncertainty, ethics and moral attitudes, and leadership in the financial sector. The reason is that the horizontal dimension, focusing on gender roles, identity and flexible biological processes, helps explain the present rather than historically developed patterns, and it zooms in on individual and group behavior rather than on societal gender structures. The Lehman Sisters Hypothesis is

about the current crisis and the day-to-day behavior of men and women in the financial sector. Of course, these can be traced to historical patterns and will differ between societies, but that is not the focus of the hypothesis.

LSH dimension one: risk aversion and behavior under uncertainty

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). Another study, among 649 fund managers in four countries, confirms that women in finance 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). This suggests that female fund managers respond somewhat differently to market volatility – which is a measure of uncertainty – than their male counterparts. 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 women referred to patience and self-restraint as their strategies in response to market volatility. A survey in the US among 2,000 men and women also showed that women are more risk averse than men: 49% of the women stated they were willing to take risk for opportunity or reward against 70% of the men (Prudential, 2012). The survey also found that women simply enjoy the sport of investing less than men (22% for women against 40% of men). These are not small differences.

As Minsky has explained, uncertainty tends to increase over time in an expanding financial market. This makes risk aversion and downward risk adjustment even more salient. A recent multi-country study on high-risk asset investment, such as risky bond trade, shows that fund managers' strategic behavior to prevent being fired amplifies the volatility of a risky bond price (Guerrieri and Kondor, 2012). Hence,

high-risk trade becomes self-reinforcing, so that over time asset prices will become more volatile, with higher average risk trading in an increasingly uncertain market. When men are more likely to take higher risks, gender imbalances on the trading floor may reinforce this dynamic.

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)². But this is mediated by both a biological factor and a behavioral factor. Women tend to behave less risky around their ovulation, according to an empirical study by Arndt Bröder and Natalia Hohmann (2003). And the gender effect becomes very small or even disappears when individuals' risk preferences are taken into account next to their sex (Barasinksa and Schafer, 2013), but this leaves unexplained the gender difference in risk preferences. Also, professional female investors have been found to be more loss-averse as compared to men, in particular when risk is low or very high (Olsen and Cox, 2012). In a study on 900,000 limited UK companies, Nick Wilson and Ali Altanlar (2009) found that companies with a female director had a statistically significant lower insolvency risk. As a consequence of the average gender difference in risk and loss aversion, and the trend towards increasing levels of risk in expanding financial markets, women tend to perform better than men because they take lower risk or take more time to respond to increasing uncertainty 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 behavior, has shown that women perform 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 behavior of singles, men earned 2.3 percent less in returns. This finding on less trading by women was recently confirmed in the earlier mentioned survey among 2,000 wealthy individuals (Barclays Wealth, 2011). The report 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 behavior. The earlier referred to study on math contests among

children explained the lower performance of boys as compared to girls after the first of five rounds by men's attitude to over-compete (Cotton et al., 2013). A similar effect of overstatement 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 over-confidence in behavior, but they also do not seem to be aware of this. A related finding comes from Weaver et al. (2012), who applied a stereotype threat method to manhood before letting 73 men play a financial risk game. The stereotype threat (making men unsure about their manhood) increased the level of risk taken by the men in the experiment and reduced their investment horizons. This effect was smaller, as expected, when their behavior was in an anonymous setting, where there was no reputational effect involved. A similar effect works for women and risk attitude. A recent study by Booth and Nolen (2012) confirms the influence of gender role beliefs about risk taking on girls. They 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 behavior – 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). Next to expressing less over-confidence, women seem to behave more contextually in an uncertain environment. A survey among fund managers found that women change their strategy more often when they 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). Professional female investors appear to weight risk attributes more than male investors (Olsen and Cox, 2001). In particular, the authors found that women weigh the possibility of loss and ambiguity more than men. 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 adapt their strategy according to the sex of their opponent (Gerdes and Gränsmark, 2010). Apparently, men are more sensitive to the sex of their opponent 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 Elo rating of chess ranking) weaker than a

female player. Apparently, playing against women triggers a stereotype gender role for men. But this reaction 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 strategic settings with uncertainty, with lower pay-offs as compared to the strategies followed by women. The financial sector itself is increasingly aware of these gender differences with lower risk and higher pay-offs for women³. 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 psycho-analytics, 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 fulfills 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, the jobs that require most abstract thinking – trading, modeling, and developing derivatives – 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 trading as before, whereas the women spent more time on research before they would take a decision (NCRW, 2009). This suggests that women may be more aware of, or willing to acknowledge, heightened uncertainty than men.

The biological dimension of gender differences in risk behavior finds support in the empirical literature too. This has been analyzed in particular in neuro-economics, focusing on hormones. 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 Sarnyai, 2010). Testosterone is known in the literature for the 'winner

effect', because it increases confidence and risk taking. Cortisol is sensitive to situations of uncertainty (Dickerson and Kemeny, 2004), while it also affects the immune system. The traders who participated in the study 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 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). This finding fits well with the biosocial constructivist theoretical framework of gender differences in behavior, which includes effects of hormones on behavior. 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. Also this finding can be explained with the theoretical framework, which allows also for an effect of behavior on hormone levels. The authors of the London traders study signal potential negative effects of their findings for financial markets. First, when testosterone is chronically elevated, 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 behavioral 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). It would be very interesting to see such a study replicated among women traders, but since there are so few women among financial traders, it will be difficult to find a comparable sample.

Experimental evidence adds to the insights from the above study. An analysis of 98 men showed that men with higher at-birth levels of testosterone as well as with higher circulating

levels of testosterone are more risk-taking in an investment game (Apicella et al., 2008)⁵. Moreover, a test of a male group of 49 London City high-frequency traders shows that traders with higher at-birth levels of testosterone not only take higher risk but also have more rapid reflexes (Coates et al., 2009). In addition, this study found that more initial testosterone predicted higher net profits, both in the short run (a day) and in the long run (20 months). So, the higher risk paid off for high basic level testosterone traders, even in volatile markets, the authors demonstrated. In an experimental study with a larger sample size (n = 413, with 53% male students), Senstrom et al. (2011) confirmed the positive relationship between initial high basic levels of testosterone with higher financial risk taking among men. Interestingly, among the 194 women who participated in the study, no statistically significant relationship with testosterone was found. Another study among over 500 students indicated nonlinear gender differences. Paola Sapienza et al. (2009) found that higher levels of circulating testosterone (hence, not higher levels at birth) were correlated with lower risk aversion among women but not among men. Moreover, at low levels of testosterone circulation, the gender difference in risk disappeared. This implies that higher current levels of testosterone have different effects on risk aversion than higher initial (at birth) levels of testosterone, and that women react stronger to higher circulating levels of testosterone than men.

For cortisol, of which men and women have comparable natural levels, empirical studies show again interesting results. Even though the cortisol levels are similar for women and men, women's bodies react much stronger to higher cortisol levels with the secretion of the hormone oxytocin than men's bodies (Nazario, n.d.). Oxytocin is a hormone that counters the production of cortisol and promotes nurturing and relaxing emotions. 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 prefrontal 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 male-female-balance on trading floors seems meaningful, while at the same time, male and female traders are advised to learn from 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)⁶.

Any policy measure to stimulate risk aversion in finance, however, is confronted with resistance from trading floors and fund managers, as the participatory study by Caitlin Zaloom reminds us. She found out that traders not only like to take risk, but actually take pleasure in risk taking and consider trading mainly as “mastery over the techniques of speculation” (Zaloom, 2006: 85). She describes how she herself experienced the pleasure of trading, beyond the potential economic gain: “The intensity of focus, the thrill of testing my wits against the market, the utter absorption in the moment-by-moment action, the absolute nature of being right or wrong, of making or losing money on every trade helped me to understand the importance that traders place on engagement with risk for its own sake, not just for profit and loss” (ibid, p. 105).

Whereas the first dimension of the LSH, risk aversion and behavior under uncertainty, relies on abundant empirical literature, the other two dimensions have much more limited sources to turn to. Next is the ethics and moral attitude dimension.

LHS dimension two: ethics and moral attitudes

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 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. This was also found in the literature on the previous LSH dimension, namely that women not only take lower levels of risk and adapt their risk levels more than men, but in doing so also weigh-in more factors. Such contextual reasoning in complex social settings, often involves ethical deliberations. Contextual moral reasoning is a major characteristic of the ethics of care, developed by Carol Gilligan on the basis of women’s experiences with moral dilemmas. On financial risk taking, Croson and Gneezy (2009: 464) therefore conclude: “we believe, as suggested by Gilligan (1982), that men’s decisions are less

context-specific than women's." This suggests that also in the world of finance, women may be led more by an ethics of care than an ethics of justice (of rules rather than of relationships).

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 clients, reducing risks that individuals, families or firms run with particular types of investments, or changing systems of reward which may tempt people to behave irresponsibly. Context, in a financial setting, refers to harm to livelihood, uncertainty, and perverse incentives (Crespo and van Staveren, 2012). 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 a frame of finance, the ethics of care may be used to analyze the financial system and banks operating in that system. I have done so in a recent study with two case studies of what I have called caring finance (van Staveren, 2013). So – what about gender and the ethics of care in moral behavior?

Two studies have tested gender differences in the ethics of care in a variety of moral dilemmas. Wark and Krebs (2000) found that the ethics of care and the ethics of justice are both rooted in persons and in types of dilemma's, for women and men alike. But since women on average, due to stereotype gender roles, tend to experience more interpersonal dilemma's, and men on average more public sphere dilemma's, women perceive more care-oriented issues in moral dilemmas, whereas men perceive more justice-oriented issues in moral dilemmas. The study by Carothers and Reis (2013) mentioned earlier in the theory section, on the dimensionality versus taxonomy of gender traits, also included a care-orientation versus justice-orientation as gender trait. Also this trait was found not to be taxonomic, but largely present in both males and females, although at varying degrees at the individual level (dimensional). But they found ambiguity between taxonomy and dimensionality for individual care orientation items. This suggests that a care orientation may not only be found on average more often among women as compared to men, but also that some care orientation attributes may be more strictly related to women. However, more empirical research needs to be done comparing gender differences between the ethics of care and the ethics of justice.

There is only very limited empirical literature testing for gender differences in moral behavior in firms and finance (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 behavior before the outbreak of the financial crisis (Kray and Haselhuhn, 2011). The study finds that male participants more often identify with the interests of an individual agent, changing their attitude towards sharing of asymmetric information, depending on whether they were assigned the seller role or the buyer role. Female participants in the study 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). This interpretation finds some support in a study with 203 in-depth interviews with moral dilemmas to adolescents by Nunner-Winkler et al. (2007). This study found that high gender identification for boys, but not for girls, was related to low moral motivation. So, perhaps a strongly masculine environment such as finance may induce lower moral concerns for men. In her participatory research among financial traders, Zaloom (2012) characterized them as asocial, adopting "an aggressive demeanor" and to "express extreme masculine belligerence and overblown competitiveness when they are on the floor and among other traders" (p. 117). She noticed that the traders were not at all concerned with the consequences of their trades for people. "There are profits to be made from the economic distress of countries and individuals, and among the asocial, there is no responsibility to any individual or to anything outside of their own goals" (Zaloom, 2012, p. 117). Even the very few female traders joined in the profane and sexist language, she noted. On the other hand, traders exert an enormous self-discipline, and characterize that as key to their trading success. This does involve a kind of responsibility: "The central virtue of the responsible trader is acute perception of financial information" (p. 127). This is, however, not a moral responsibility but a technical one,

enforced by the market: “If a trader breaks from his internal codes, the market ‘punishes’ him by causing losses” (p. 127). Discipline was also found among women wealth investors, as referred to earlier, who restrained themselves from trading too quickly and from reacting to financial news when the prices of their assets became volatile or simply going down. Such self-discipline in finance is an expression of prudence, the virtue already mentioned by Adam Smit as driving economic agents on markets. For high-frequency trading (short term) it implies acute perception, whereas for wealth investment (long term) it implies patience. The four elements of discipline that the traders enforce upon themselves have nothing to do with a concern for other people, but rather the opposite. Zaloom found out that traders’ discipline involves: (1) to separate actions on the trading floor from those of their lives outside (2) to control the impact of loss on themselves (3) to break down continuities between past, present, and future (4) and to maintain acute alertness in the present moment. They use various strategies to accomplish this discipline, for example by referring to the currency they trade in not as dollars or pounds or euros but as ‘ticks’.

This leads us to the stereotype threat literature of gender differences and morality. In an anonymous situation, where social role expectations are excluded, women appear to behave just as aggressively in games as men, or even a bit more (Lightdale and Prentice, 1994; Stuhlmacher, e al., 2007). So, when gender roles are made irrelevant by excluding an audience, gender differences in the asocial attitude of hostility become zero. This suggests that more responsible financial behavior in real-life settings may require not just better regulation, but also awareness about how strongly financial behavior in social settings is gendered. And, perhaps, also here biology plays a role. A recent experimental study has analyzed the relationship between responder’s reactions in the ultimatum game (which is about rejecting unfair proposals) on the one hand and certain sex-hormone genes on the other hand. Although the differences in response behavior between the male and female participants in the game were small, the researchers did find different sex-hormone genes related to women’s and men’s responses (Chew, Ebstein and Zhong, 2013).

The empirical literature about ethics and moral behavior in finance is quite limited. That makes it difficult to draw strong conclusions. But all the studies that I found seem to suggest that women tend towards more fair and responsible behavior than men in complex social settings, because they seem to be concerned more with relationships than with interests. It is clear that much more empirical research needs to be done about the role of responsibility and fairness in financial relationships, and gender differences therein.

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 sidelined, just a year before the bank collapsed (*The Economist*, 2010). Male whistle blowers were, like their female colleagues, 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 refer to 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 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 FED and the IMF are now both led by women.

But the fact that we see now women cleaning up the mess 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) says. 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 to exclude 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 or no 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 and that gender diversity in leadership may improve business performance. 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. Fang et al. (2012) show with data of nearly 3,000 US publicly listed firms that heterogeneity of CEO networks has a strong impact on firm value, including gender heterogeneity. If the social network of a CEO has a five percent increase in women, this would result in an increase of 0.6% in firm value. A Canadian study has shown that firms with two or more women on board rank higher in accountability as well as in profit and revenue (Conference Board of Canada, 2002). A recent study by Credit Suisse (2012) analyzing almost 2,400 companies worldwide, showed that companies with at least one woman on the board show a superior share price performance, higher Return on Equity (ROE) and less exposure (debt equity). Another recent empirical study, by Miriam Schwarz-Ziv (2012), analyzed 402 board meeting minutes of eleven Israeli boards in which government holds a substantial equity interest (and therefore have been required to be relatively gender-balanced for already two decades). The author found that boards with a critical mass of at least three women appear to be more active and those firms achieved higher ROE and profits. Finally, as referred to earlier, Wilson and

Altanlar (2009) also found a relationship between gender balance on boards and firm performance, but not measured as the share of women in boards but as the sex of the board director. They found that among 900,000 UK firms, firms with a female board director have a lower likelihood of insolvency, take on less debt, and have a better cash-flow than firms with a male board director.

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. More diverse boards bring in more perspectives in decision making, they may do a better ‘reading of the market’ as compared to homogeneous boards, and they may contribute more variation in board functioning in terms of communication and questioning established patterns. Moreover, there is the standard economic argument that by excluding women from boards, talent is wasted, and opportunities for having the best talents on board are being reduced. Therefore, I now discuss some empirical studies that zoom in on leadership qualities and gender differences therein. 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 women were higher rated than men, including in finance and accounting (Zenger and Folkman, 2012). The ratings of the individual managers 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 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 as agentic versus communal. Women score statistically significantly better on 75% of the items, which include typical agentic items, which are generally stereotyped as masculine. For example, the biggest male-female differences in favor of women leaders were found in the competences of “Takes Initiative” and “Drives for Results”, which are commonly seen as masculine rather than feminine. Female leaders also scored higher on the only explicit ethical competence that was included, namely “Displays High Integrity and Honesty”, as well as on relational dimensions, 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. 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 the two stereotypical categories of agentic, and communal. The two leadership styles appeared to be negatively correlated. Interestingly, the authors found that both types of leadership behaviors are more strongly expressed by female leaders than by male leaders. The authors conclude therefore that “Female managers worldwide combine ‘soft’ with ‘hard’ leadership behaviors. 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).

A recent paper by Lyda Bigelow et. al (2012) analyzed 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 stereotypes about female leadership. As explained in the biosocial constructivist theoretical framework used in this paper, we see again the strength of traditional gender beliefs, resulting in stereotyping leadership as masculine. This is clearly not only inadequate, or unfair to women leaders, but also results in stereotype leadership hiring and assessment, keeping women below the glass ceiling.

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’ characteristics and performance. This legacy of our societies’ gender stereotyping and gender identities helps to explain the strength of the glass ceiling in finance, as well as the phenomenon of the glass cliff during financial crises. More female leadership in the financial sector could probably not only help improve financial governance, but may also function as a psychological lever to remove the glass ceiling by enabling female leadership to walk the talk.

Conclusion

The Lehman Sisters Hypothesis has received strong symbolic meaning in debates on the behavioral dimensions of the financial crisis. My analysis of the empirical literature on gender differences in risk attitudes and response to uncertainty, in ethics and moral behavior, and in leadership, finds preliminary but clear empirical support for the hypothesis. Women are found to be more risk and loss averse, less overconfident, and applying a wider range of responses to uncertainty. 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 review of the empirical literature also indicates that women act more contextual in complex situations with more attention to relationships rather than interests. Finally, the recent empirical literature on gender and leadership shows that the glass ceiling mechanisms still operate, despite research demonstrating that female leaders are evaluated more positively than male leaders. Apparently, leadership is still connected with what people believe to be masculine values, and hence, more connected with men, even though female leaders use on both agentic and communal behavior.

The varied collection of insights from the empirical literature indicates that gender differences in financial behavior should not be very surprising. The behavioral differences found in risk aversion and response to uncertainty, in ethics and moral attitude, and in leadership, are all explained, or at least made understandable, in the biosocial constructivist framework of gender differences developed by Alice Eagly. Financial behavior appears to be no exception to other behavior in which men and women show average differences.

In conclusion, the Lehman Sisters Hypothesis finds support in the empirical literature. If Lehman Brothers would have been an investment bank with 50% women, or even 100%, we still would have had the crisis, given the enormous dominance of men in the rest of the financial sector, the strength of gender stereotypes, based on outdated gender beliefs and affecting gender identities in often unproductive ways. Such a 'sisters bank' could not have existed in the first place. But the more general viewpoint behind the hypothesis, that substantially more gender diversity in finance, and particularly at the top, would help to reduce some of the behavioral drivers behind the crisis, clearly finds support in the empirical literature.

However, further empirical research is necessary in order to fill in remaining gaps. In particular in the ethical dimensions, the interaction effects between males and females, and the persistence of constraints for women leaders in banking.

References

- Acker, Joan (2006) 'Inequality Regimes. Gender, Class and Race in Organisations', *Gender & Society* 20 (94), pp. 441-464.
- Ahmed Azmi, Rania (2008) "Mutual Funds Performance: Does Gender Matter in an Emerging Market", mimeo, University of Portsmouth.
- Apicella, Coren, Anna Dreber, Benjamin Campbell, Peter Gray, Moshe Hoffman, and Anthony Little (2008), 'Testosterone and Financial Risk Preferences', *Evolution and Human Behavior* 29, pp. 384-390.
- Ashby, W.R. (1958) "Requisite Variety and its Implications for the Control of Complex Systems", *Cybernetica* 1 (2).
- Barasinska, Natalya (2010) Would Lehman Sisters have done it Differently? An Empirical Analysis of Gender Differences in Investment Behavior. FINESS Working Paper D.6.2. EU FP7.
- Barasinska, Natalya, and Dorothea Schäfer (2013) 'is the Willingness to Take Financial Risk a Sex-Linked Trait? Evidence from National Surveys of Household Finance', Discussion Paper no 05/2013. Frankfurt am Main: Deutsche Bundesbank.
- Barber, Brad, and Terrance Odean (2001) "Boys Will Be Boys: Gender, Overconfidence, and Common Stock Investment", *Quarterly Journal of Economics* 116 (1), pp. 261-292.
- Barclays Wealth (2011) Understanding the Female Economy. The Role of Gender in Financial Decision Making and Succession Planning for the Next Generation. London: Barclays Wealth and Ledbury Research.
- Beckmann, Daniela, and Lukas Menkhoff (2008) 'Will Women Be Women? Analyzing the Gender Difference among Financial Experts', *Kyklos* 61 (3), pp. 364-384.
- Berger, Allen, Thomas Kick, and Klaus Schaeck (2012) Executive Board Composition and Bank Risk Taking. Discussion Paper No. 03/2012. Deutsche Bundesbank.

- Bigelow, Lyda, et. al (2012) Skirting the Issues: Experimental Evidence of Gender Bias in IPO Prospectus Evaluations. Working Paper available at <http://ssrn.com/abstract=1556449>
- Booth, A., D. Granger, A. Mazur, and K. Kivlighan (2006) 'Testosterone and Social Behavior', *Social Forces* 85, pp. 167-191.
- Booth, Alison, and Patrick Nolen (2012) 'Gender Differences in Risk Behaviour: Does Nurture Matter?', *The Economic Journal* 122 (February), pp. F56-F78.
- Bröder, Arndt, and Natalia Hohmann (2003), 'Variations in Risk Taking Behavior over the Menstrual Cycle – an Improved Replication', *Evolution and Human Behavior* 24, pp. 391 – 398.
- Brown, Kelly, and Laura Taylor (2000) 'Do as You Say, Say as You Do: Evidence on Gender Differences in Actual and Stated Contributions to Public Goods', *Journal of Economic Behavior and Organization* (43), pp. 127-139.
- Carothers, Bobbi, and Harry Reis (2013) 'Men and Women are from Earth: Examining the Latent Structure of Gender', *Journal of Personality and Social Psychology* 104 (2), pp. 385-407.
- Chang, Susan Arterian (2010) 'Outsiders and Outperformers: Women in Fund Management', *The Finance Professional's Post*, 04/05/2010.
- Coates, J.M., and J. Herbert (2008) 'Endogenous Steroids and Financial Risk Taking on a London Trading Floor', *PNAS* 16 (105), pp. 6167-6172.
- Coates, John, Mark Gurnell, and Aldo Rustichini (2009), 'Second-to-Fourth Digit Ratio predicts Success among High-frequency Financial Traders', *PNAS* 106 (2), pp. 623-628.
- Coates, John M., Mark Gurnell and Zoltan Sarnyai (2010) 'From Molecule to Market: Steroid Hormones and Financial Risk-Taking', *Philosophical Transactions of the Royal Society Biological Sciences* 365, pp. 331-343.
- Conference Board of Canada (2002), Women on Boards – Not Just the Right Thing ... But the 'Bright' Thing. Ottawa: The Conference Board of Canada.
- Cotton, Christopher, Frank McIntyre, and Joseph Price (2013), 'Gender Differences in Repeated Competition: Evidence from School Math Contests', *Journal of Economic Behavior and Organization* 86, p. 52-66.
- Credit Suisse (2012) Gender Diversity and Corporate Performance. Research Institute. Zurich: Credit Suisse AG.
- Crespo, Ricardo, and Irene van Staveren (2012) 'Would We have had this Crisis if Women had been Running the Financial Sector?', *Journal of Sustainable Finance and Investment* 1 (3-4), pp. 241-250.
- Croson, Rachel, and Uri Gneezy (2009) 'Gender Differences in Preferences', *Journal of Economic Literature* 47 (2), pp. 448-474.

- Dickinson, Sally S., and Margaret E. Kemeny (2004) 'Acute Stressors and Cortisol Responses: A Theoretical Integration and Synthesis of Laboratory Research', *Psychological Bulletin* 130 (3), pp. 355-391.
- Dreber, A. and M. Johannesson (2008) 'Gender Differences in Deception', *Economics Letters* (99), pp. 197-199.
- Drew, Ina (2013) Testimony before the U.S. Senate Subcommittee on Investigations. Washington D.C., March 15.
- Economist, The, (2010) 'Cinderella's Moment – Risk Managers to the Fore' *The Economist*, 11 February.
- Eisenegger, C., M. Naef, R. Snozzi, M. Heinrichs, and E. Fehr (2010) 'Prejudice and Truth about the Effect of Testosterone on Human Bargaining Behaviour', *Nature*, 463, pp. 356-361.
- Ely, Robin, and Irene Padavic (2007) 'A feminist Analysis of Organizational Research on Sex Differences', *Academy of Management Review* 32 (4), pp. 1121-1143.
- Fang, Yowei, Bill Francis, and Iftekhar Hasan (2012) More than Connectedness – Heterogeneity of CEO Social Network and Firm Value. Bank of Finland Discussion Paper no. 26. Helsinki: Bank of Finland,
- Fisher, Melissa (2012) *Wall Street Women*. Durham; Duke University Press.
- Frankenhaeuser, Marianne (1996) "Stress and Gender", *European Review* 4, pp. 313-327.
- Gilligan, Carol, 1982. *In a Different Voice. Psychological Theory and Women's Development*. Cambridge (MA): Harvard University Press.
- Gerdes, Christer and Patrik Gränsmark (2010) Strategic Behavior across Gender: a Comparison of Female and Male Expert Chess Players. Bonn: IZA Discussion Paper no. 4793.
- Guerrieri, Veronica, and Peter Kondor (2012) 'Fund Managers, Career Concerns, and Asset Price Volatility', *American Economic Review* 102 (9), pp. 1986-2017.
- Israel, Salomon, Ori Weisel, Richard P. Ebstein, and Gary Bornstein (2012) Oxytocin, But Not Vasopressin, Increases both Parochial and Universal Altruism. Jerusalem: Hebrew University of Jerusalem Discussion Paper no. 598.
- Kray, Laura, and Michael Haselhuhn (2011) Male Pragmatism in Ethical Decision Making. Working Paper. Berkely: Institute for Research on Labor and Employment.
- Lightdale, Jenifer, and Deborah Prentice (1994), 'Rethinking Sex Differences in Aggression: Aggressive Behavior in the Absence of Social Roles', *Personality and Social Psychology Bulletin* 20, pp. 34-44.
- Lofton, Louann (2011) *Warren Buffett Invests like a Girl – and Why You Should, Too*. New York: The Motley Fool.
- McDowell, Linda (2011) 'Making a Drama out of a Crisis: Representing Financial Failure, or a Tragedy in Five Acts', *Transactions of the Institute of British Geographers* 36 (2), pp. 193-205.

- McKinsey & Company (2007) *Women Matter – Gender Diversity, a Corporate Performance Driver*.
- NCRW (2009) *Women in Fund Management. A Road Map for Achieving Critical Mass – and Why it Matters*. New York; NCRW.
- Nazario, Brunilda (n.d.) Why Men and Women Handle Stress Differently. WebMD Feature, URL: http://thestressoflife.com/why_men_and_women_handle_stress_.htm
- Nelson, Julie (2012) ‘Are Women Really More Risk-Averse than Men?’, INET Research Note #012, 2012. New York: Institute for New Economic Thinking.
- New York Times (2012) ‘The Woman Who Took the Fall for JPMorgan Chase’, 3 October. By Susan Dominus. 10 July.
- Niederle, Muriel, and Lise Vesterlund (2010) ‘Explaining the Gender Gap in Math Test Scores: the Role of Competition’, *Journal of Economic Perspectives* 24 (2), pp. 129-144.
- Niessen, Alexandra, and Stefan Ruenzi (2005) ‘Sex Matters. Gender and Mutual Funds’, Paper of the Department of Corporate Finance & Centre for Financial Research. Cologne: University of Cologne.
- Nunner-Winkler, Gertrud, Marion meyer-Nikele, and Doris Wohlrab (2007), ‘Gender Differences in Moral Motivation’, *Merrill-Palmer Quarterly*, 53 91), pp. 26-52.
- Olsen, Robert, and Constance Cox (2001) ‘The Influence of Gender on the Perception and Response to Investment Risk: the Case of Professional Investors’, *Journal of Psychology and Financial Markets*, 2 (1), pp. 29-36.
- Peil, Jan, and Irene van Staveren (eds.), 2009. *Handbook of Economics and Ethics*. Cheltenham: Edward Elgar.
- Prudential (2012) *Financial Experience and Behaviors among Women*. Newark: Prudential Financial, Inc.
- Raymond, Jennifer (2013), ‘Most of us are biased’ *Nature* 495, 7 March, pp. 33-34.
- Ridgeway, Cecilia L. (2001) ‘Gender, Status, and Leadership’, *Journal of Social Issues* 57 (4), pp. 637-655.
- Robinson, R.J., R.J. Lewicki, and E.M. Donahue (2000) ‘Extending and Testing a Five Factor Model of Ethical and Unethical Bargaining Tactics: Introducing the SINS Scale’, *Journal of Organizational Behavior* (21), pp. 649-664.
- Rosin, Hanna (2012) *The End of Men and the Rise of Women*. New York: Riverhead Books.
- Roughgarden, Jane. (2004) *Evolution's Rainbow. Diversity, Gender, and Sexuality in Nature and People*. Berkeley: University of California Press.
- Rutterford, J, and J. Maltby (2006), “‘The Widow. The Clergyman, and the Reckless’ – Women Investors Before 1914”, *Feminist Economics* 12 (1/2), pp. 111-138.

- Ryan, Michele K. And S. Alexander Haslam (2005) „The Glass Cliff: Evidence that Women are Over-Represented in Precarious Leadership Positions“, *British Journal of Management* 16, pp. 81-90.
- Sapienza, Paola, Luigi Zingales, and Dario Maestri (2009), ‘Gender Differences in Financial Risk Aversion and Career Choices are affected by Testosterone’, *PNAS* 106 (36), pp. 15268-15273.
- Schwarz-Ziv (2012) Does the Gender of Directors Matter? SSRN paper available at: <http://ssrn.com/abstract=1868033>
- Smith, Pamela, Daniël Wigboldus and Ap Dijksterhuis (2008) “Abstract Thinking Increases One’s Sense of Power”, *Journal of Experimental Social Psychology* 44, pp. 378-385.
- Stenstrom, Eric, Gad Saad, Marcelo Nepomuceno, and Zack Mendenhall (2011), ‘Testosterone and Domain-specific Risk: Digit Ratios (2D:4D and *rel2*) as predictors of recreational, financial, and social risk-taking behaviors’, *Personality and Individual Differences* 51, pp. 412-416.
- Stuhlmacher, Alice, Maryalice Citera and Toni Willis (2007), ‘Gender Differences in Virtual Negotiation: Theory and Research’, *Sex Roles* 57, pp. 329-339.
- Taylor, Shelley (2001) *The Tending Instinct*. New York: Times Books.
- Tuckett, David, and Richard Taffler (2008) ‘Phantastic Objects and the Financial Market’s Sense of Reality: a Psychoanalytic Contribution to the Understanding of Stock Market Instability’, *International Journal of Psychoanalysis* (89), pp. 389-412.
- Tronto, Joan (1993) *Moral Boundaries. A Political Argument for an Ethic of Care*. London: Routledge.
- Vanguard Retirement Centre Research (2011) *The Great Recession and 401(k) Plan Participant Behaviour*. Valley Forge: The Vanguard Group Inc.
- Van den Bos, Ruud, Marlies Hartevelt and Hein Stoop (2009), “Stress and Decision-making in Humans: Performance is Related to Cortisol Reactivity, Albeit Differently in Men and Women”, *Psychoneuroendocrinology* 34, pp. 1449-1458.
- Van Emmerik, IJ. Hetty, Martin Euwema, and Hein Wendt (2008) ‘Leadership Behaviors around the World’, *International Journal of Cross Cultural Management*, 8 (3), pp. 297-315.
- Van Staveren, Irene (2013) ‘Caring Finance Practices’, *Journal of Economic Issues* 47 (2), pp. 419-425.
- Van Vianen, Annelies, and Agneta Fischer (2002) ‘Illuminating the Glass Ceiling: the Role of Organizational Culture Preferences’, *Journal of Occupational and Organizational Psychology*, 75 (3), pp. 315-337.
- Waerness, Kari. 2009. “The Ethics of Care”, in Jan Peil and Irene van Staveren (eds.), *Handbook of Economics and Ethics*. Cheltenham: Edward Elgar, 138-43.
- Wark, Gillian, and Dennis Krebs (2000), ‘The Construction of Moral Dilemmas in Everyday Life’, *Journal of Moral Education*, 29 (1), pp. 5-21.

- Weaver, J., J. Vandello, and J. Bosson (2012) 'Intrepid, Imprudent, or Impetuous?: the Effects of Gender Threats on Men's Financial Decisions', *Psychology of Men and Masculinity*, February 6, pp. 1-12.
- Wilson, Nick, and Ali Altanlar (2009) 'Director Characteristics, Gender balance and Insolvency Risk: an Empirical Study', SSRN Working Paper: <http://ssrn.com/abstract=1414224>
- Wood, Wendy, and Alice Eagly (2012), 'Biosocial Construction of Sex Differences and Similarities in Behavior', *Advances in Experimental Social Psychology*, 46, pp. 55-123.
- Zahidi, Saadia, and Herminia Ibarra (2010) *The Corporate Gender Gap Report 2010*. Geneva: World Economic Forum.
- Zaloom, Caitlin (2006) *Out of the Pits – Traders and Technology from Chicago to London*. Chicago: Chicago University Press.
- Zenger, Jack, and Joseph Folkman (2012) 'Are Women Better Leaders than Men?', *Harvard Business Review*, March 15.

Notes

¹ I found only one paper that did an empirical test of the risk dimension 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 in fund managers' decisions, 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).

² 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 stereotype manhood to the women by 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.

³ 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/>

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, although having been ill most of the previous year and confronted with sudden personnel changes, resigned as a consequence (NY Times, 2012; Drew, 2013). 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.

⁵ Initial levels of testosterone are levels that occur in utero, hence, already present at birth. These levels are measured through a proxy variable, namely the 2 digit to 4 digit ratio: the lower this ratio, the higher the in utero level of testosterone that a fetus has been exposed to. Circulating levels of testosterone measure actual levels (which fluctuate within a hour) by saliva samples.

⁶ 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.

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

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.