

Asset Allocation and Divorce Risk

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Hedge fund collapse boss faces legal fight

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Flamboyant hedge fund manager Florian Homm could face legal actions from investors and even from his own former employers after the collapse in the value of the [shares](#) of Absolute Capital.



Homm, the 6ft 8in German stockpicker feted as genius by some in the City, quit AbCap last week, announcing his departure with an extraordinary resignation letter ... That led to a run on the shares of AbCap, sending them **crashing by more than 90%** to open today at 51p ...

Where does the ex-wife come in? It turns out they had just been through a divorce, and as part of the settlement, he gave her millions of shares of Absolute Capital...

... Complicating matters further, a report in the *Sunday Times* of [London](#) yesterday claims that [Homm went to Zurich to see his ex-wife](#) last weekend, just days before he surprised everyone with his resignation. According to "a friend" of Homm's, the [meeting](#) went badly.

The Nastiest Divorce Battle in Hedge Fund History

With her marriage on the rocks, Ambrosiadou spends wildly, and confiscates the family jet from Coward, who tried to take off with a 23-year old



Coward was reportedly traveling in Greece alongside a new travel partner, [a 23 year-old Brazilian named Leiana](#) who the 52 year-old Coward is apparently dating is reportedly a major reason behind Ambrosiadou's decision to [confiscate his private plane](#).

Understanding Client Economics

- Portfolio advice to private investors as it can be read in textbooks excludes many aspects of real life and instead focuses on speculative demand risk factors stemming from the investment opportunity set alone, i.e. **speculative demand** alone.
- Real life is more complex than that. Investment solutions for private investors need to incorporate shadow assets (human capital or family business), liabilities (spending power at retirement) and background risk.
- We look at the impact of divorce risk as an example of background risks and the importance of understanding the implicit contingent claims in divorce law in order to correctly arrive at an asset allocation that is in the client's best interest.

Key Ideas

- A Marriage Contract is a complex structured product that gives each party a set of contingent claims that are both hard to value and have an impact on the optimal asset allocation decisions of both partners.
- From our analysis we find that divorce law can lead to lower equity allocations than both partners find individually optimal.
- It can make strategic divorce (gain access to spouse resources not accessible during marriage) attractive and lead to welfare increasing prenuptial agreements for both partners.

Asset Allocation When Single

$$(1) \quad U(W) = (1 - \gamma)^{-1} W^{(1-\gamma)}$$

$$(2) \quad W[w] = W_0(1 + c + w(R - c))$$

$$(3) \quad \ln(1 + R) \sim N(\mu, \sigma^2)$$

$$(4) \quad w^* = \arg \max_w EU(W[w]) = \arg \max_w \int U(W[w]) f(W[w])$$

For $\mu = 0.05$, $c = 0$, $\sigma = 0.2$ and $\gamma = 5$ we arrive at $w^* = 49.2\%$. The problem is solved directly by discretizing the probability distribution of returns. This represents our benchmark case. It applies to all single investors independent of how wealthy they are (due to CRRA preferences). How will marriage change this allocation?

(German) Divorce Law

- Across time, lawyers in different societies offer an almost infinite variety of solutions to what each of them called justice at its time. Justice seems to bend to time and location. Economists on the other side analyse the effect of such rules on individual decision taking and the associated welfare implications. They are guided by principles of rational decision making that are universal rather than the casuistic treatment by lawyers.
- “Zugewinnngemeinschaft” (community of accrued gain): stipulates that at the time of divorce, gains in a spouses portfolio must be shared with the marriage partner (equalisation of accrued gains), while losses cannot be imposed on the other partner. During marriage both partners are entitled to manage their assets independently. The “Zugewinnngemeinschaft” only applies at the point of divorce.

- Example A: Partner I sits on 1 million Euros of asset gains, while partner II managed his portfolio to grow only by 0.1 million Euros (either because the initial portfolio was small or returns were meagre). Total gains are 1.1 million Euros so each spouse is entitled to 0.55 million Euros and partner 1 needs to transfer 0.45 million Euros to partner 2.
- Example B: The same as before but instead of earning 0.1 million Euros on her portfolio her assets fall by 0.2 million Euros. Total gains are 1 million and partner 1 needs to pay 0.5 million Euros. In other words: individual accrued gains must be shared, individual losses can't be mutualized.

- We first introduce the probability to get divorced, θ . It is an unconditional probability, i.e. it is exogenously given.

- **Final wealth when staying married** is the same as in (2).

$$(5) \quad W_i^m [w_i] = W_{i,0} \left(1 + c + w_i (R - c) \right)$$

- **Final wealth when getting divorced** follows the respective divorce law as described above (“Zugewinnngemeinschaft”) which can be formalized as

$$(6) \quad W_i^d [w_i, w_j] = W_{i,0} \left(1 + \frac{\max(c + w_i (R - c), 0) + \min(c + w_i (R - c), 0)}{2} \right) + W_{j,0} \left(\frac{\max(c + w_j (R - c), 0)}{2} \right)$$

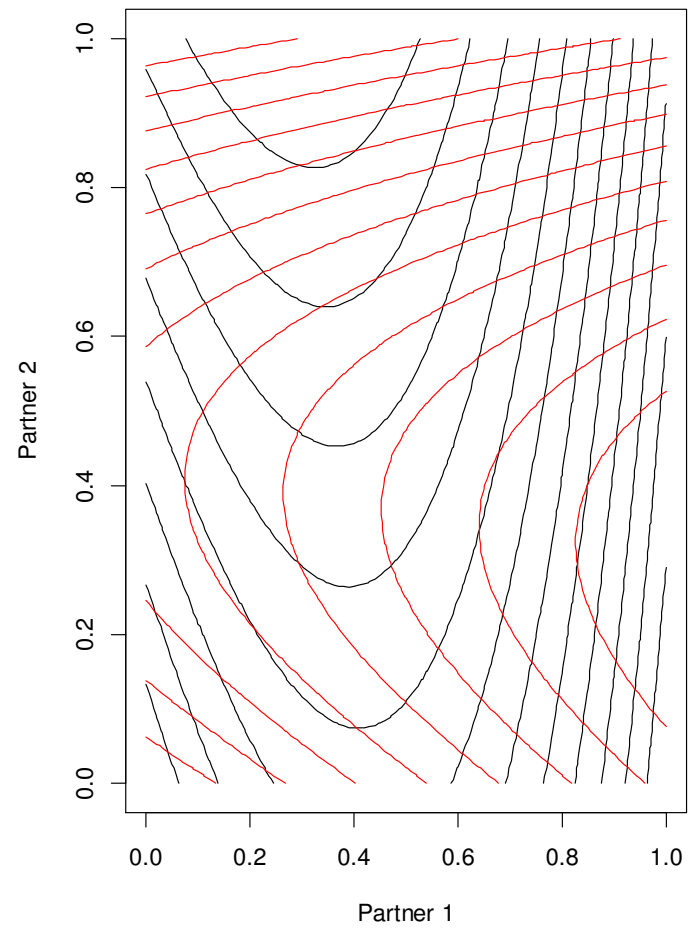
- The first term in brackets in (6) represents the limited upside for a married investor combined with the full downside if his investments turn out to provide negative returns. We could heuristically think of this as being short a put on assets and long only half a call.
- The second term reflects the contingent claim on the (during their marriage) accrued gains by the spouse. The amount of the potential claim depends on the riskiness of the spouse's investments as well as on the spouses initial wealth. Marrying a richer partner can as such provide a substitute for investing into the stock market (provided the partner does it).
- Wealth at the end of period is a weighted average of payoffs in case of getting divorced, W^d (i.e. after the court redistributed assets) and remaining married, W^m , i.e. $(1 - \theta)W^m + \theta W^d$.

- Expected utility after one period as a function of each spouse's allocation into the risky asset is given by

$$(7) \quad EU[w_i, w_j] = (1 - \theta) \int U(W^m[w_i]) f(W^m[w_i]) + \theta \int U(W^d[w_i, w_j, \dots]) f(W^d[w_i, w_j, \dots])$$

- We can now plot the iso-utility curves for all combinations of equity allocations for both partners. As numerical examples we use $\gamma = 5$, $\mu = 0.05$, $\sigma = 0.2$, initially equally wealthy partners, $W_{i0} = W_{j0} = 1$. Divorce risk is set to $\theta = \frac{1}{3}$. This represents the statistical average in Germany. **The minimum of a particular iso-utility curve for partner i marks the point where – for a given asset allocation of partner j - partner i will not find it optimal to either increase or decrease his weight. We will see in the next section that all reaction curves pass through these minima. Utility for partner 1 (partner 2) increases from bottom to top (left to right).**

Exhibit 1: ISO-utility curves for both spouses



Optimal Asset Allocation in a Marriage of Equals

- So far, we briefly described our model setup. Now, we create reaction curves for each partner. Reaction curves describe the optimal asset allocation for partner i - for a given asset allocation for partner j . They model the best response to the spouse's asset allocation. Formally this is expressed in the following optimization problem:

$$(8) \quad w_i^* = \arg \max_{w_i, w_j = \bar{w}_j} (1 - \theta) \int U(W^m[w_i]) f(W^m[w_i]) + \theta \int U(W^d[w_i, w_j, \dots]) f(W^d[w_i, w_j, \dots])$$

- The crossing of both reaction curves marks the point where both partners hold asset allocations that are both individually optimal and consistent with the respective spouse's assets allocation, such that no partner has an incentive to deviate from this solution.

Exhibit 2: Equilibrium asset allocation for married couple with average divorce risk ($\theta = \frac{1}{3}$)

Dotted lines represent the optimal asset allocation when single. Bold lines (passing through the minimum of each partners respective iso-utility curves) show each partners reaction curves.

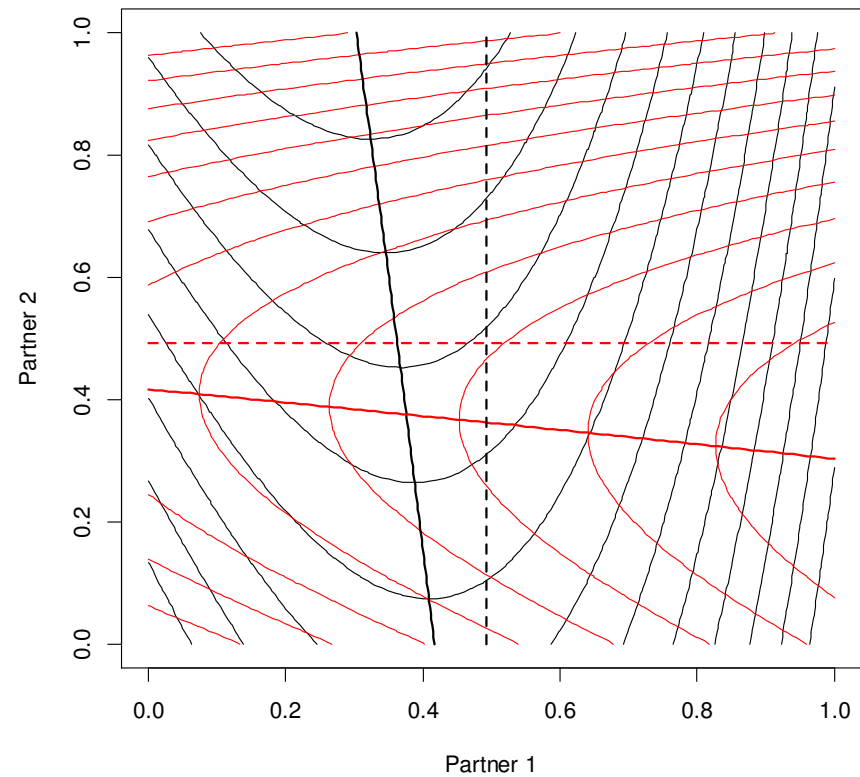
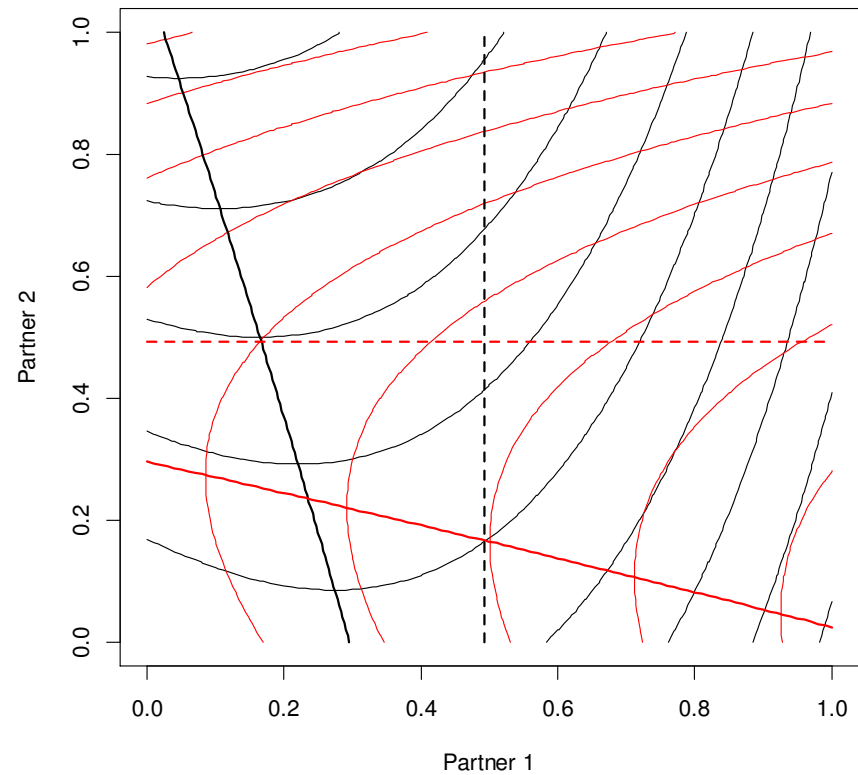


Exhibit 3: Equilibrium asset allocation for married couple with above average divorce risk ($\theta = \frac{2}{3}$)

Dotted lines represent the optimal asset allocation for singles. Bold lines (passing through the minimum of each partners respective iso-utility curves) show each partners reaction curves.

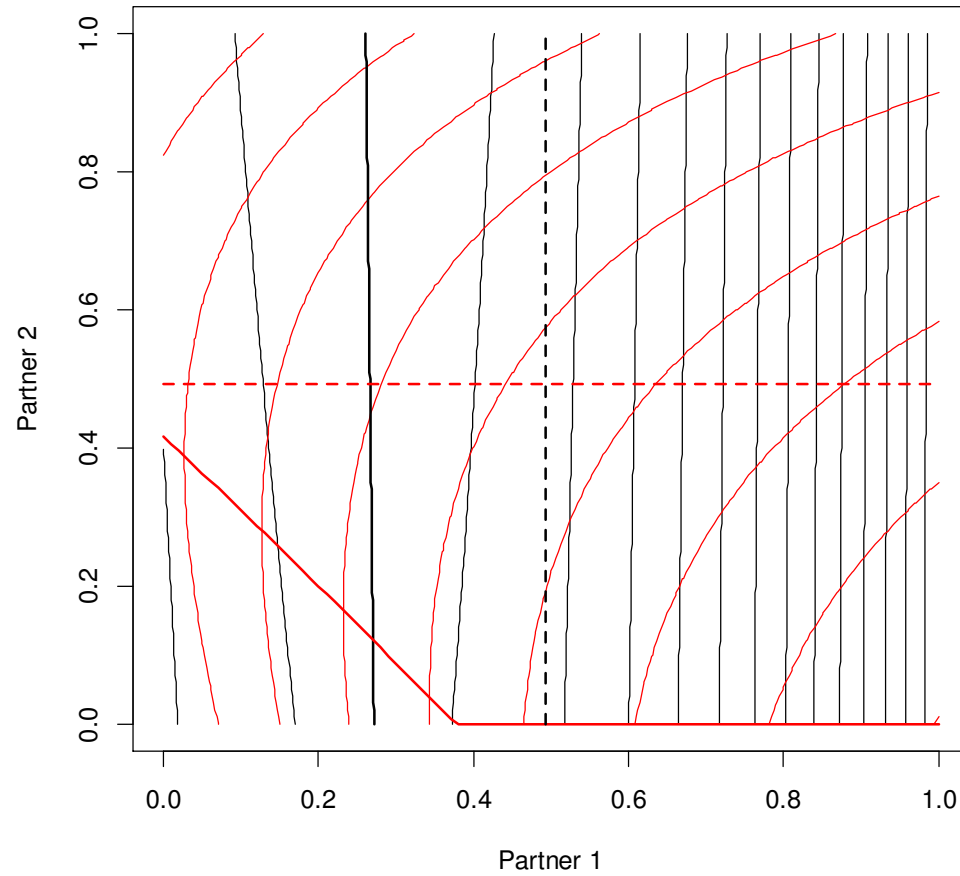


- **A prenuptial agreement nullifying the welfare decreasing divorce law would then be in the best interest of both partners.** Without this agreement we need to focus on the partner's reaction curves. Our analysis shows two remarkable results with negative welfare implications for the particular divorce law under study.
- **First, both partners invest less into equity markets in the derived NASH equilibrium than what they would optimally do when being single. The particular divorce law is welfare decreasing.**
- **Second, each partner sees his spouse's investment into risky assets as partial (slope of the reaction curve) substitute for his own investments into risky assets. As a consequence they invest less into equities.** The result is driven by the particular divorce law in combination with the likelihood of a divorce. The higher the likelihood of a divorce the less valuable investing in risky assets on your own becomes.

- Experiencing the full downside with only half the upside is not an incentive to take on risky investments. Instead it would make more sense if the other partner takes the investment risk.
- However, the spouse will undertake the same analysis and equally cut back on investing into the risky asset.
- The impact of a higher divorce probability is shown in Exhibit 3 for $\theta = \frac{2}{3}$. We notice, that the reaction curves become flatter (as the likely divorce makes the spouse's investment the preferred way to enter equity markets, i.e. partial upside with no downside) and the NASH-equilibrium results in an even larger gap between the optimal asset allocation in a marriage relative to the optimal asset allocation when being single.

Asset Allocation When One Partner Is Considerably (here 10 times) Richer

The richer partners reaction curve shows little sensitivity to the spouses equity allocation as its too small to have an impact on his utility.



- While the value of the contingent claim against the spouse rises in value, the richer partner only holds one claim against the less wealthy partner, while she holds 10 claims against him. The opposite is true for the less wealthy partner. In fact there comes a point when the less wealthy partner entirely gives up investing into risky assets as he creates better (upside only) exposure from the call on the richer partners assets.

Conclusion

- In reality the standard marriage contract we sign on the happiest day of our life is a complex structured product that gives each party a set of contingent claims that are both extremely hard to value and have an impact on the optimal asset allocation decisions of both partners.
- On top of this you add an ever changing law and idiosyncratic judges. We then understand why marriage is the single most important factor for old age poverty and why prenuptial arrangements removing both legal uncertainty as well as arriving at better risk sharing and much simpler to value mutual financial claims have always been in demand for wealthy people.

- Given the heterogeneity of international divorce rulings this contribution has not meant to offer general asset allocation advice, but a generalizable method to think about asset allocation under divorce risk with respect to the arbitrariness of local divorce laws. We show that the German divorce law (equalisation of accrued gains or “Zugewinnngemeinschaft”) is welfare decreasing and leads to an underinvestment into risky assets relative to what is individually optimal.

Literature

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- **VOENA A. (2010)**, Yours, Mine And Ours: Do Divorce Laws Affect The Intertemporal Behaviour Of Married Couple, Job Market Paper, Stanford