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Abstract

We study possible motivations for co-entrepenurial couples to start up a joint firm, us-ing a sample of 1,069 Danish couples that established a joint enterprise between 2001 and 2010. We compare their pre-entry characteristics, firm performance and post-dissolution private and financial outcomes with a selected set of comparable firms and couples. We find evidence that couples often establish a business together because one spouse ? most commonly the female ? has limited outside opportunities in the labor market. However, the financial benefits for each of the spouses, and especially the fe-male, are larger in co-entrepreneurial firms, both during the life of the business and post-dissolution. The start-up of co-entrepreneurial firms seems therefore a sound in-vestment in the human capital of both spouses as well as in the reduction of income ine-quality in the household. We find no evidence of non-pecuniary benefits or costs of co-entrepreneurship

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JEL-codes: J12, L26.

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1. Introduction

"Co-entrepreneurial" businesses operated by married or cohabiting couples[1] account for many startups throughout the world. Dyer, Dyer and Gardner (2012), cite surveys indicating that at least eighty percent of businesses worldwide employ family members, and one third of these include spouses. In the United States it has been crudely estimated that fifteen percent of small businesses in 2000 were co-entrepreneurial (Muske, cited in FSBS, 2008).[2] Clearly, couple-owned and operated businesses are a significant component of small firms.[3]

There are many popular press stories about entrepreneurial couples. Some stories focus on the attractions for couples of establishing a business together, often highlighting glamorous examples of successful ventures founded by couples (see, for example, the numerous online articles about Julia and Kevin Hartz, co-founders of Eventbrite). Others, in contrast, document the chaos that can ensue when a successful business partnership is destroyed by marital discord (e.g., Grigoriadis, 2012). There is however, scant empirical evidence on representative entrepreneurial couples, and what little there is presents a picture bearing no resemblance to the anecdotes in the popular press. For example, in Marshack's (1994) survey of 60 couples, half engaged in joint entrepreneurship and half dual-career, entrepreneurial couples exhibited much more traditional gender roles than dual-career couples. Similarly, Fitzgerald and Muske (2002) find in a small sample from the 1997 National Family Business Survey (NFBS) that co-entrepreneurs are more likely than individual entrepreneurs to have a home-based business and less likely to harbor ambitions or expectations of business growth.

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[1] We shall also refer to couples that jointly operate a business as co-entrepreneurs.

[2] This estimate for the United States may be a little high: in the narrower but more precisely-measured Panel Study on Income Dynamics (PSID) 71 (eight percent) out of 884 owner-manager businesses were found to be co-entrepreneurial (Dyer at al., 2012).

[3] Another piece of evidence that co-entrepreneurship is not a marginal phenomenon is the large and growing stream of 'self-help' books for this target group with catchy titles such as "Couples at Work: How can you Stand to Work with your Spouse?" (James and James, 1997); "In Business and in Love: How Couples Can Successfully Run a Marriage Based-Business" (Jones and Jones, 2003) or "Sleeping with your Business Partner: A Communication Toolkit for Couples in Business Together" (Stewart-Gross and Gross, 2007).

The Panel Study of Income Dynamics (PSID) has identified co-entrepreneurs since its 1996 wave, but related studies using this sample have only tangentially grappled with the co-entrepreneurial couple. For example, Parker (2008) studies the interaction between spouses' decisions to become entrepreneurs; his sample contains co-entrepreneurs but they are not separately examined. Dyer et al. (2012) study the effect on profits of individuals joining a business that had been founded at some earlier date by their spouse; their sample likely includes businesses best described as co-entrepreneurial but they are not distinguished from those in which the spouse has joined as an employee rather than partner.

In this paper, we study entrepreneurial couples identified in the Danish matched employer-employee dataset. The sample we construct consists of three groups. The first is the focus of analysis: 1,069 co-entrepreneurial couples. The second group includes 161 couples owning two businesses that they operate separately, and the third consists of 3,928 couples in which one spouse operates a business while the other is active in the labor force. To ensure that the firms we analyze are comparable, we restrict attention in each of the three groups to firms that at the time of founding (between 2001 and 2010) had exactly two people including the entrepreneurs working in them.[4] The Danish data cover the universe of Danish adults and businesses, and provide a wealth of personal and commercial data. On the commercial side, we are able to identify business creation by couples in a precise manner, to track business performance, pre-founding earnings and employment, and post-dissolution earnings and family outcomes. The data allow us to examine individual wages separately for each spouse, as well as other differences between them. On the personal side, we have access to the usual set of demographic data. More unusually, we are able to construct proxies for rates of happiness by group using data such as the prescribing of anti-depressants, anxiety and insomnia medication (Dahl, Nielsen and Mojtabai, 2010).

Our analysis is presented in three parts. In section 3, we compare pre-founding characteristics of our three groups of couples, in Section 4 we look at the performance of their firms; and in Section 5 we look at the personal financial and non-financial consequences of running a (joint) business and of dissolving one.

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[4] In a related paper, Coad and Timmermans (2012) use the Danish data to study the effects of founder diversity. Like us, they restrict attention to dyads – two-founder firms -- and in many regressions include a control for whether the dyad is a couple.

We find evidence that couples often establish a business together because one spouse – most commonly the wife[5] – has limited outside opportunities in the labor market. Perhaps as a consequence, co-entrepreneurial firms tend to maintain a smaller scale than the comparison firms but their smaller scale does not induce a lower profit level or a higher dissolution rate. We find no evidence of non-pecuniary benefits (or costs) of co-entrepreneurship. In contrast, financial benefits are significant and substantial: Both spouses, but especially the wife, gain more income from their business than do the couples in the control group, compared to the earnings generated prior to the business startup. This larger increment to earnings survives firm dissolution (for couples whose firms are closed down). Therefore, we conclude that both partners seem to invest more in their (firm specific) human capital than do the comparison couples. This larger specific investment is justified by the lower likelihood of hold-up. Co-entrepreneurial couples are likely to trust each other better and to have more valuable carrots and sticks to force the other to invest in the business relationship. Evidently, the value of the specific investments is not limited to the firm because it remains positive even after firm dissolution and spills over to the new labor market positions of the spouses. The start-up of co-entrepreneurial firms seems therefore a sound investment in the human capital of both spouses as well as in the reduction of income inequality in the household. At the same time, we do not find evidence that the joint business harms or benefits the relationship of the spouses, even after the dissolution of the firm.

2. Data

Our data come from government registers collected in the Integrated Database for Labor Market Research (referred to by its Danish acronym, IDA) and the Entrepreneurship Database, both maintained by Statistics Denmark. IDA holds comprehensive, annually updated, longitudinal data on all individuals in Denmark from 1980 to 2010. The dataset links employees to annual demographic information on their employers, including financial information. The Entrepreneurship Database meanwhile contains annual information, including most importantly the identities of the primary founders, on new firms in Denmark from 2001 to 2010.

Our sample is drawn from the population of startups listed in the Entrepreneurship Da-

[5] For convenience, we shall use the terms husband and wife, although the definition of a couple in our sample is based on cohabitation, not marital status.

tabase.[6] We identify 105,675 startups from 2001 to 2010 founded in the private sector, which can be matched to the firm information in the IDA. This sample is reduced to 104,448, because 1,227 founders of these startups cannot be identified in dataset in the year of founding (most likely because the founders are outside the Danish labor market in the year of founding). We remove the start-ups founded by entrepreneurs who are not married or cohabiting, as well as couples with one or both spouses aged younger than 18 or older than 65 years. This leaves us with 73,950 startups. We further restrict the sample to consist only of startups with exactly two individuals involved with the business in the first year. We do this to create the best comparison groups for entrepreneurial couples. This greatly reduces the sample to 5,158 startups, where 1,069 are co-entrepreneurial couples, 161 are couples owning two businesses that they operate separately, and 3,928 are couples in which one spouse operates a business (with exactly two individuals involved) while the other is active in the labor force.

We compare these three different groups based on observable information on individuals in the IDA data. Most variables are straightforwardly defined. Income variables are based on annual wage income reported in the tax forms. Household wealth is measured by the annual income from stocks, other financial, and real assets.[7] We assume that this wealth income reflects the total value of the stock of wealth. In section 5, we distinguish co-entrepreneurial couples from the other groups in terms of their post-venture startup outcomes. Among other things, we study the mental health of couples by focusing on stress. Following Dahl, Nielsen and Mojtabai (2010), we combine our demographic data with information on drug prescriptions from the Danish Medicines Database. We create dummy variables for stress equal to one, if the individual has received one or more prescriptions for stress-related medication (anti-depressants, insomnia, and anxiety medication).[8]

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[6] The data are held under restrictive control by Statistics Denmark due to the sensitivity of the information. All Stata do- and log-files are available upon request.

[7] While this variable (formueindk_ny) does not include income from sale of stocks or properties, it does include dividends, interest and rental income. Therefore, while we use this variable to measure pre-entry wealth, we do not consider it to be an interesting measure of the outcome of the business venture.

[8] These are identified using the relevant WHO-classification codes (ATC). The drugs are benzodiazepines (ATC: N05CF), benzodiazepine receptor antagonists (ATC: N05BA) and, selective serotonin re-uptake inhibitors (ATC: N06AB) (Dahl, Nielsen and Mojtabai, 2010).

3. Motives for co-entrepreneurship

We consider economic motivations, both positive and negative, as well as non-pecuniary motivations. On the economic side we discuss: (**A**) couples where a spouse has limited labor market options, so that joining the entrepreneurial spouse's business is an attractive option; (**B**) wealth constraints, which may prevent couples in which both spouses have entrepreneurial aspirations from establishing separate businesses; and (**C**) productivity motivations, where the trust and intimacy enjoyed by couples lowers communication and coordination costs and ameliorates conflicts that may otherwise arise in business partnerships. This greater trust may also increase the amount of effort each partner invests to develop their human and organizational capital. Non-pecuniary motivations (**D**) include factors such as the pleasure a couple may have in working together and the flexibility co-entrepreneurship may provide in balancing the demands of work and family life.

3.1 *Motivations driven by pre-entry conditions*

In this subsection, we discuss the evidence for motivations **A** and **B**, drawing on the results reported in Tables 1 and 2. Table 1 contains summary statistics for the year prior to business creation for our three comparison groups: co-entrepreneurs in column I, couples with two separate businesses in column II, and couples with a single entrepreneur in column III. Recall that in each of these groups we restrict attention to firms that initially have exactly two workers including the founders. Table 2 reports estimates from probit regressions, where the dependent variable equals one if the couple operates a single business together. The probit regressions enable us to check whether differences between raw means in the summary statistics are robust to the inclusion of controls.

A. *Opportunity costs.* It is known from many diverse samples that individuals who move between jobs were paid less well than the average for observationally equivalent workers that stayed (e.g., Evans and Jovanovic, 1989). The relationship between prior wages and entry into entrepreneurship is less clear: Swedish evidence suggests that prior wages are higher for agents who establish limited liability companies but lower for those who enter self-employment (Tåg, Åstebro and Thompson, 2013). The canonical explanation for the lower wages of movers is that labor market frictions assign some workers to a job for which they are poorly matched (Jovanovic, 1979; Åstebro, Chen and Thompson, 2011), and for them the opportunity cost of moving is lower than average.

It is likely that in at least some cases in our sample, labor market mismatches drive non-entrepreneurial spouses to join a firm established by their partner. Labor market mismatches may be likely in general for spouses with a working partner, but even more likely in the case of couples with an entrepreneur. Entrepreneurs are likely to limit the partner's choice of work location (and they often stick to their home environment, Dahl and Sorenson, 2012) and to work harder and thereby limit the number of hours the spouse can offer in the labor market.

Although in many instances the non-entrepreneurial spouse will appear in the registry data as a founder (and may therefore be indistinguishable from an owner that exercises control rights), the nature of the work undertaken may be more like that of a relatively junior employee. While we cannot, of course, directly examine the work done, we can examine pre-entry earnings to see if they are consistent with a labor market mismatching motivation for joint entrepreneurship.

Table 1 reports household earnings in the year prior to business creation along with individual incomes of the spouses in the same year. Although prior earnings of husbands are indistinguishable across groups, the average prior earnings of women in the sample of co-entrepreneurs are much lower than for the other two groups. Women in co-entrepreneurial couples earned an average DKK152,000 in the year prior to business creation, about DKK57,000 (27 percent) less than women in couples that formed two businesses, and DKK75,000 (33 percent) less than women in the third control group. These differences in means are statistically significant and, clearly, economically meaningful. The probit estimates in Table 2 reveal that these differences persist after the inclusion of numerous control variables—in fact, these are among the strongest results in Table 2.

TABLE 1

Descriptive statistics before the startup of the company

	Entrepreneurial Couples				**Couples with a single entrepreneur**[c]	
	with a joint firm[a]		**with separate firms**[b]			
	I		II		III	
	Mean	St dev	Mean	St dev	Mean	St dev

Education level of husband (months)	159.9	29.6	157.2	32.4	157.5**	29.3
Education level of wife (months)	153.6	28.5	153.3	28.3	156.4***	29.4
Year of founding ($2001 < t < 2010$)	2005.1	2.5	2004.6**	2.2	2004.9**	2.5
Age of husband	43.4	9.3	41.0***	7.9	40.6***	9.1
Age of wife	41.0	9.3	38.4***	8.2	38.5***	9.0
Number of years together (of last 20 years)	10.5	6.9	8.1***	6.4	10.6	6.8
Marriage (vs cohabiting)	0.29	0.46	0.14***	0.35	0.25***	0.43
Number children aged 0-5	0.43	0.70	0.52	0.73	0.47*	0.72
Number children aged 6-12	0.53	0.79	0.58	0.89	0.52	0.75
Number children aged 13-17	0.29	0.58	0.26	0.58	0.28	0.56
Household income (1,000 DKK)	464.9	391.12	559.6**	573.5	559.0***	375.6
Husband's income (1,000 DKK)	312.8	345.4	349.9	503.9	331.2	330.8
Wife's income (1,000 DKK)	152.1	143.3	209.7***	190.0	227.8***	141.1
Household wealth (1,000 DKK)	149.3	105.1	100.8	209.4	92.7***	240.9
Unemployment history of husband	963.1	1828.9	1339.8**	1920.6	859.0*	1523.2
Unemployment of wife	1662.9	2223.5	1442.6	1843.3	1454.8	2119.3
Number of observations	1,069		161		3,928	

Income, wealth and employment statistics are all measured in the year before the (first) startup in the household. All other variable values are measured in the year of (the first) startup. *** Denotes mean significantly different from column I at the 1% level; at the ** 5% level; * 10% level. [a] Couples (married or cohabiting) who jointly start up a firm between 2001 and 2009. At the start, nobody other than the couple is active in the firm. [b] Couples who each start up a separate firm between 2001 and 2009. The spouses start up their firms simultaneously, with a maximum period of three years between the two start dates. Both firms are started up together with exactly one other person. [c] One of the spouses founds a firm between 2001 and 2009 together with one other person not being his/her partner. The spouse is employed in an unrelated firm.

Figure 1 provides some further evidence on income differences. The upper panel plots kernel densities for men's incomes in the three groups, while the lower panel plots the corresponding densities for women. All the densities are bimodal, and each mode is centered on similar values for the three groups. The main difference between the groups is found in the greater mass of very low earners among women in co-entrepreneurial couples (it is largely this greater mass of very low earners that reduces the mean of this group of women), suggesting that there are a large number of women with very low opportunity costs of joining the family business.

The evidence is clearly consistent with the conjecture that spouses – specifically women – frequently join the family business because the opportunity cost of doing so is low. This is in turn consistent with the notion of labor market mismatching. However, it may also reflect Marshack's (1993) finding that couples working together in their own business are more traditional than other couples and the wife is more likely to have a tenuous relationship with the labor market. The higher average age and marriage rate of couples engaging in co-entrepreneurship may be indicative of this idea that more traditional couples are attracted to joint entrepreneurship. Indeed, we find some crude indication that this is the case in our sample: couples in this group are not only significantly more likely to be married, the women have also had on average longer or more frequent unemployment spells.

B. *Wealth constraints.* Motivated by the seminal work of Evans and Jovanovic (1989), a substantial literature has provided evidence that entrepreneurs with limited personal wealth face binding credit constraints. Basic evidence for credit constraints is inferred from the observation that personal wealth predicts both entrepreneurial entry (Blanchflower and Oswald, 1998; Holtz-Eakin et al., 1994) and initial business size (Hvide and Moen, 2010), and that these correlations exist also when attempts are made to instrument for the potential correlation between wealth and unobserved entrepreneurial ability. Early studies used inheritance or lottery winnings as an instrument (e.g., Blanchflower and Oswald, 1998; Lindh and Ohlsson, 1996). After some evidence that that inheritance may be a poor instrument (Hurst and Lusardi, 1994; Disney and Gathergood, 2009), later studies used exogenous shocks in housing prices (Hurst and Lusardi, 2004; Disney and Gathergood, 2009; Nykvist, 2008; Fairlie and Krashinsky, 2012; Schmalz et al., 2013). Collectively, these studies indicate that liquidity constraints bind more

TABLE 2

Probit Estimates

Entrepreneurial couples with a joint firm versus other entrepreneurial couples

	Determinants of Entrepreneurial Couples			
	Comparison group: Entrepreneurial couples with separate firms		**Comparison group: Couples with a single entrepreneur**	
	II		III	
	Coefficient	St error	Coefficient	St error
Education level of husband (months)	.0016	.0019	.0024***	.0008
Education level of wife (months)	.0018	.0020	-.0004	.0009
Age of husband	.0139	.0112	.0192***	.0053
Age of wife	-.0043	.0120	.0214**	.0057
Number of years together	.0307***	.0102	-.0278***	.0048
Marriage (vs cohabiting)	.7209***	.1965	.0683	.0890
Number children aged 0-5	-.0387	.0803	.0378	.0363
Number children aged 6-12	-.0922	.0653	.0876***	.0303
Number children aged 13-17	.0103	.0924	.0916**	.0406
Husband's income (1,000 DKK)	-.0003*	.00014	-.0001	.0001
Wife's income (1,000 DKK)	-.0017***	.00035	-.0028***	.0002
Household wealth (1,000 DKK)	.00004	.00010	.00009*	.00005
Unemployment history of husband	-.0049**	.0024	.0015	.0012
Unemployment of wife	.0021	.0023	-.0015	.0009
Pseudo *R* squared	0.123		0.093	
Number of observations	1,073		4,460	

All regression equations include year dummies and a constant.

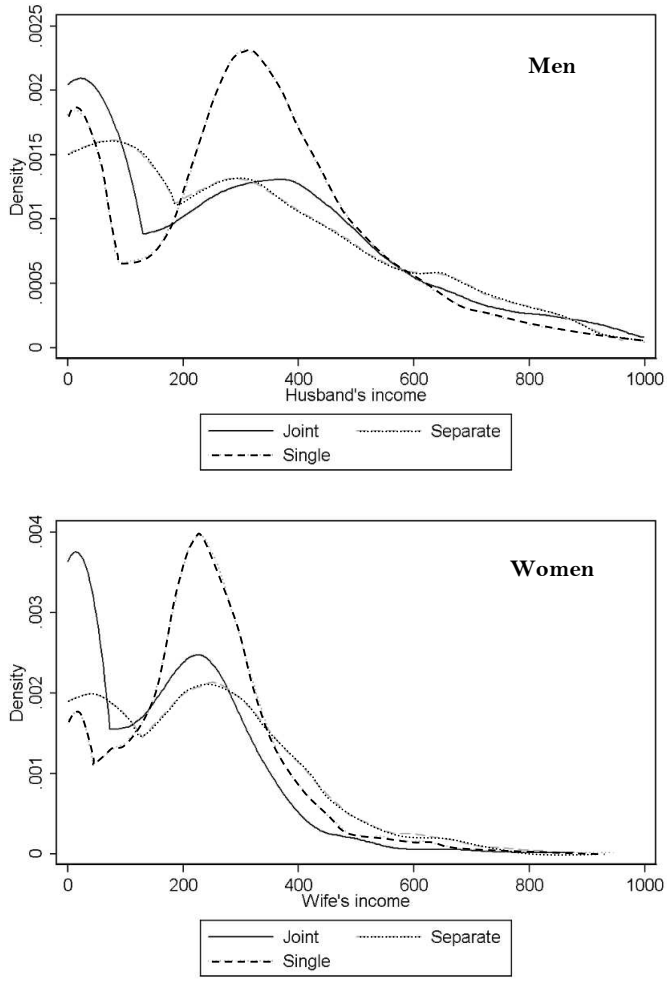


FIGURE 1. *Densities of individual income by group.* Upper panel: men; Lower panel: women. Epanechnikov kernel density estimates, using default settings in Stata 13.

severely in Continental Europe than in the US. Nanda (2011) has documented evidence of wealth constraints in Denmark (see Figure 2). He found that businesses created by the wealthiest entrepreneurs tend to underperform, suggesting that preferences for business creation can be acted upon without restraint only in the absence of binding credit constraints.

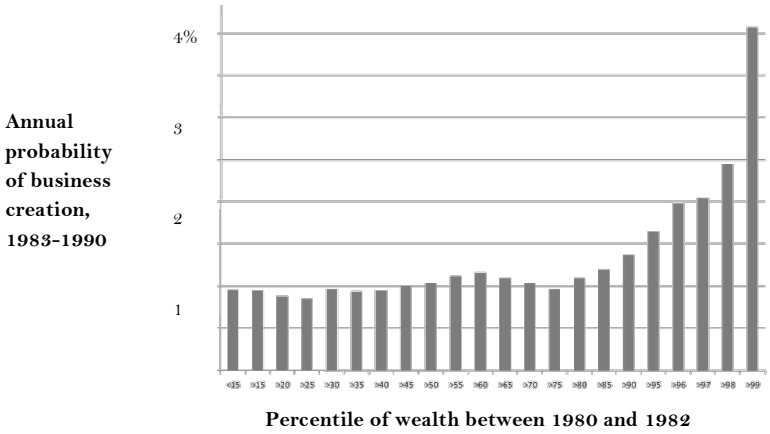
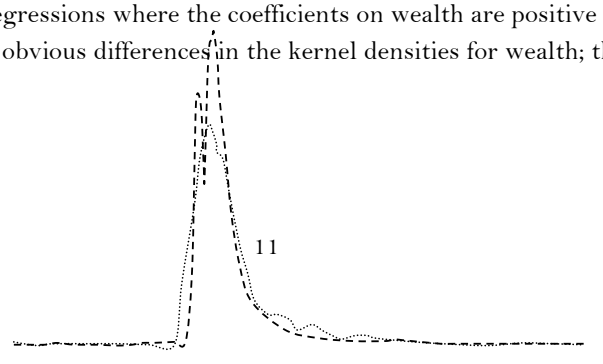


FIGURE 2. *Probability of Business Creation, by percentile of assets.* Source: Nanda (2011)

Wealth constraints may induce co-entrepreneurship when both spouses have individual aspirations to become entrepreneurs. Although both may have a desire for the autonomy afforded by running their own businesses, financial limitations may prevent them from investing in two firms. A single, joint business, while perhaps not the couple's ideal, at least offers an imperfect substitute. The evidence, however, does not support this.

In Table 1, mean household assets in the year prior to business creation are greater among co-entrepreneurs than they are for the other groups, a finding that is also evident in the probit regressions where the coefficients on wealth are positive (see Table 2). Figure 3 reveals no obvious differences in the kernel densities for wealth; the differences



in group means are apparently driven by outliers.[9]

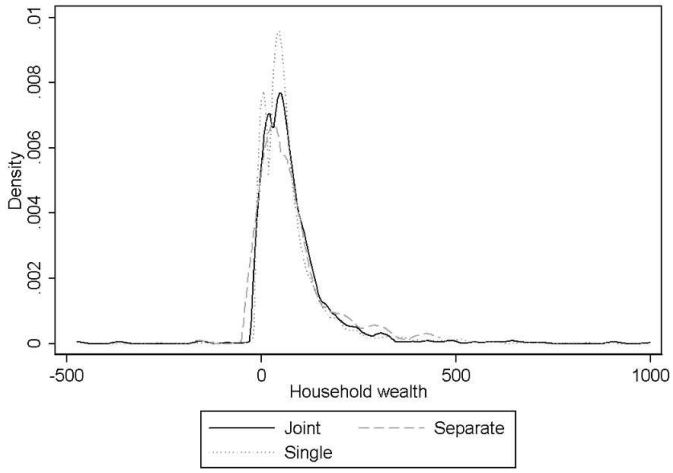


FIGURE 3. *Densities of household wealth by group.* Epanechnikov kernel density estimates, using default settings in Stata 13.

3.2 *Motivations related to firm performance and labor market outcomes*

In this subsection, we discuss **C,** higher productivity due to more cohesion and/or higher levels of (and investment in) organizational or human capital and **D,** non-pecuniary motivations. The pre-entry statistics summarized in Table 1 are not especially useful for examining whether these motivations are at play in our sample. However, both have implications for post-entry performance and labor market outcomes, which will be examined in Section 4.

C. *Productivity.* We offer three reasons why co-entrepreneurial business might outperform other new dyadic firms, all of them related to the greater familiarity and trust that likely spouses have for one another relative to unrelated business partners.

- Co-entrepreneurial firms are likely to benefit from the cohesion that typifies successful spousal relationships. Cohesion, which Shaw (1981:213) defines as "the degree to

[9] Hurst and Lusardi (1994) showed that the association between liquidity constraints and entrepreneurship may be highly non-linear.

which members of the group are attracted to each other" provides partners with higher levels of affect and trust for, and satisfaction with, each other (Ensley, Pearson and Amason, 2002) and numerous studies have shown that cohesion is a strong predictor of performance (see, for example, Mullen and Copper, 1994, for a meta-analysis). Smith et al. (1994:432) found that "top management teams that work well together react faster, are more flexible, use superior problem solving techniques, and are more productive and efficient than less integrative teams." As Ensley at al. note, these consequences of cohesion in new ventures are especially important because of the complexity and ambiguity of tasks required for successful business creation.

- Organizational capital (OC), the private information a firm uses to enhance its production (Prescott and Visscher, 1980), is an important determinant of the large cross-sectional variations we observe in firm productivity (e.g., Atkeson and Kehoe, 2005; Syverson, 2004). OC is a form of firm-specific human capital, manifested in work practices such as organizing and planning strategy, communicating and coordinating activities, workforce training, task design, and matching workers to tasks (e.g., Black and Lynch, 2005, Squicciarini and Le Mouel, 2012). In their seminal study, Prescott and Visscher (1980) modeled the accumulation of OC as a process of learning about the best assignment of workers to tasks by trial and error; firms that had better information about their workers' skills had better productivity. Co-entrepreneurs generally have an information advantage over other types of founders, and as a result their firms are likely to start out with more OC than others.

- Entrepreneurial partnerships inevitably demand firm-specific investments in, *inter alia*, the accumulation of organizational and human capital. Consequently, each founder must contend with the possibility that other partners may seek opportunities to engage in hold-up (Williamson, 1975). In an attempt to limit exposure to hold-up risk, each business partner engages in costly actions to reduce the asset-specificity of his or her investment in the firm; the greater the risk of hold-up, the more costly are the efforts undertaken to mitigate the risk, and the more damage is done to the firm even in the absence of hold-up. A major determinant of the likelihood of hold-up is the long-term cost an agent must pay in order to extract the short-term gains from exercising hold-up. These costs may take the form of loss of reputation (limiting future business opportunities), the risk of lawsuits, and the end of what may have been a long-term relationship with the wronged partner. Indeed, business relationships that are structured so as to maintain long-term relationships are generally held to be helpful in mitigating the hold-up problem; in turn these relationships are more easily

sustained when the parties to a transaction have other interlinked interests (see, for example, Dyer, 1996, on Japanese *keiretsu*).

It does not seem contentious to suggest that co-entrepreneurs are less likely than others to be subject to hold-up problems. First, hold-up involves a transfer of wealth from one party to another, but in the case of co-entrepreneurs, this leaves household wealth unchanged. Second, aggrieved entrepreneurs likely have a number of ways to retaliate outside the business when their partner is also their spouse. In fact, valuable credible threats, but also promises, may be more readily available to co-entrepreneurial partners than to others. Entrepreneurial couples are therefore likely to be more productive due to their higher investments in organizational and human capital. Human capital, in most cases, is only partly specific to the current application and is partly useful in future activities as well (Lazear, 2003) possibly due to 'industry specific' human capital (Neal, 1995) or to interdependencies between general and specific investments in human capital (Kessler and Lülfesmann, 2006). In other words, if investments in human capital of each of the spouses are indeed higher in co-entrepreneurial ventures, it is likely that their productivity is also somewhat higher in their subsequent activity, all else equal.

D. *Non-pecuniary benefits.* Supposing that spouses are in a relationship because they like to interact, it is obviously possible that couples establish businesses together at least in part because of anticipated non-pecuniary gains from working side by side. Indeed, in a number of surveys, co-entrepreneurs have reported that working together had enhanced their personal relationships (Cox, Moore, and Van Auken, 1984; Wicker and Burley, 1991). Co-entrepreneurs may also value the flexibility for managing work and home life, such as taking care of children, that is afforded by working with an understanding partner who shares the same non-work goals and concerns.

4. Firm performance and labor market outcomes of co-entrepreneurial couples

Motivations **C** and **D** have testable implications for firm performance as well as financial and non-financial outcomes at the personal level. If co-entrepreneurs are motivated by the productivity advantages that being in a personal relationship offers, then we should expect to see them outperform other types of startups, all else equal. In contrast, non-pecuniary benefits of co-entrepreneurship induce spouses to establish firms that may not have especially good economic prospects, and they will continue to operate these busi-

nesses in the face of relatively poor performance. Moreover, if the human and organizational capital investments in co-entrepreneurial firms are larger, we should expect that the personal incomes of the entrepreneurs increase accordingly. Human capital investments can only be specific in part and are likely to be also partly general; as a result we expect they would also lead to higher incomes after the dissolution of the co-entrepreneurial firm. Non-pecuniary benefits finally should coincide with a happier couple.

In this section, we first compare the size and profitability (Table 3), and survival rates (Table 4), of co-entrepreneurial businesses with those founded by unrelated partners. We then study the financial and non-financial results of entrepreneurship for both spouses (Table 5). Finally we measure the financial and non-financial results of co-entrepreneurial ventures after their dissolution in comparison to couples where only one of the partners is involved in a dyadic firm (Table 6). Together, these analyses provide insights into the empirical validity of motivations **C** and **D**. We exclude from our analysis couples that establish two separate business, because this sample is small. Our analyses are explorative in the sense that they do not allow any causal interpretation due to the self-selection of couples into our groups (and assortative mating) based on unobservable characteristics.

Table 3 reports panel OLS estimates of firm performance, using sales, profits, and firm size as outcome measures. The main result is that co-entrepreneurial firms are smaller and generate profits of comparable levels as firms founded by unrelated partners. Co-entrepreneurs operate firms that generate, on average, twenty percent less sales. Co-entrepreneurial firms are also on average fourteen percent smaller (in terms of personnel) than the comparison group after the first year, even though all firms began with exactly two members.

Table 4 reports estimates from a piecewise exponential hazard regression for firm dissolution. A notable feature of the hazard regression is that co-entrepreneurial firms are as likely to fail as the comparison group. Figure 4, which plots non-parametric dissolution hazards, confirms this finding. Thus, based on these conditional correlations and consistent with Fitzgerald and Muske (2002), we find that co-entrepreneurial firms are smaller, but not less profitable or more likely to dissolve than their counterparts.

Table 5 shows the estimated 'private costs and benefits' of co-entrepreneurial ventures after startup. Panel A measures financial outcomes for each of the spouses, relative to other entrepreneurial couples as well as to the pre-venture situation. Panel B tabulates

non-financial outcomes, such as happiness and relationship-related outcomes (e.g., marriage, divorce and fertility). Each cell in Table 5 shows the coefficient of the dummy 'co-entrepreneurial business' estimated in a regression equation in which the row variable is the dependent variable. Each regression includes the control variables that were used in Tables 3 and 4.

FIGURE 4. *Firm dissolution hazards*

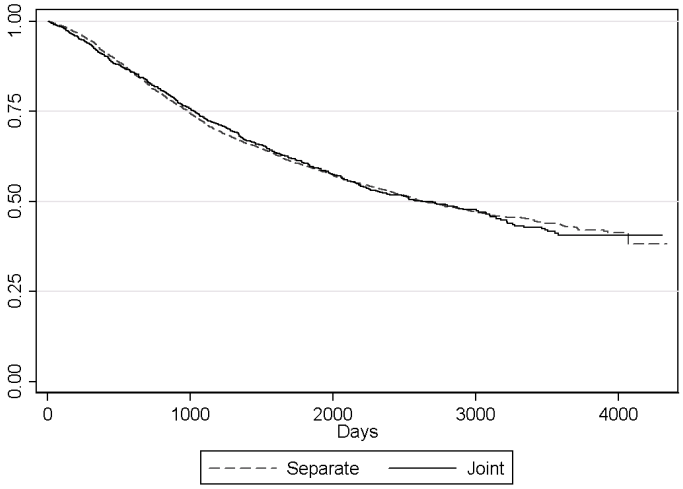


TABLE 3

Panel Regressions: business performance of entrepreneurial couples.

	Panel OLS		**Panel OLS**		**Panel OLS**		**Panel OLS**	
	LN(SALES)		LN(PROFITS)		LN(SIZE)		PROFIT/SIZE	
	Coef.	St error	Coef.	St error	Coef.	St error	Coef.	St error
Co-entrepreneurs = 1	-.1984***	.0199	-.0335	.0239	-.1394***	.0099	38.78*	20.99
Education husband (months)	-.0007**	.0003	.0010***	.0003	-.0001	.0001	-.2052	.3032
Education of wife (months)	.0011***	.0003	-.00002	.0004	.0002	.0001	.3352	.3121
Age of husband	-.0065***	.0019	-.0031	-.0023	-.0041***	.0010	1.441	2.016
Age of wife	.0025	.0020	.0020	.0024	-.0010	.0010	1.301	2.131
Number of years together	.0030*	.0017	.0052**	.0021	.0023***	.0009	-1.373	1.793
Married = 1 (vs cohabiting)	.2594***	.0388	.2059**	.0472	-.0288	.0194	16.08	40.75
Number children aged 0-5	.0634***	.0122	.0620***	.0149	.0035	.0061	39.06***	12.85
Number children aged 6-12	.0245**	.0105	.0085	.0126	.0108**	.0051	-12.14	11.00
Number children aged 13-17	-.0376**	.0150	.0120	.0182	-.0042	.0075	-8.052	15.82
Husband's pre-entry income	.0002***	.00003	.0003***	.00003	.00001	.00001	.1722***	.0290
Wife's pre-entry income	.0005***	.00006	.0003***	.00008	9.25E-07	.00003	.0790	.0639
Household pre-entry wealth	-4.48E-06	.00003	2.03E-06	.00003	-.00002***	7.79E-06	.0096	.0272
Unemployment history of husband	-.0064***	.0004	-.0020***	.0005	-.0008***	.0002	.0457	.4714
Unemployment of wife	-.0010***	.0003	-.0006	.0004	-7.67E-06	.0002	.1916	.3615
Adj, R-squared	.119		.043		.037		.003	
Number of observations	22,256		18,097		22,740		19,933	

All regressions include year dummies, firm age dummies and a constant. Income and wealth variables are in DKK1,000.

TABLE 4

Firm Dissolution Hazards

	Exponential regression log relative-hazard form	
	Coefficient	St error
Entrepreneurial couples (dummy)[a]	-.0344	.0589
Education level of husband (months)	-.0007	.0008
Education level of wife (months)	-.0026***	.0009
Age of husband	-.0009	.0055
Age of wife	-.0070	.0058
Number of years together	-.0177***	.0049
Marriage (vs cohabiting)	-.2190**	.1057
Number children aged 0-5	-.0471	.0362
Number children aged 6-12	.0122	.0308
Number children aged 13-17	.0053	.0438
Husband's income, *t = -1* (1,000 DKK)	-.0000	.0001
Wife's income, *t = -1* (1,000 DKK)	.0001	.0002
Household wealth, *t = -1* (1,000 DKK)	-.00003	.0001
Unemployment history of husband	.0031***	.0012
Unemployment of wife	.0018*	.0010
LR chi^2 (33)	236.44	
Number of dissolutions	1,986	
Number of subjects	4,459	
Number of observations	22,723	

Year and firm age dummies effects included.

Panel A of Table 5 shows that couples in co-entrepreneurial firms experience greater income gains that do couples with a single entrepreneur; this is true both collectively and for each spouse ('husband's/wife's income relative to income prior to founding'). Panel A of Table 5 shows that *both* co-entrepreneurial spouses increase their incomes relative to the pre-entrepreneurial period to a greater extent than do other couples These relative income gains are large enough to change the income ordering of co-entrepreneurial husbands and wives. Although it is still the case that female co-entrepreneurs earn less than their female counterparts in other entrepreneurial couples (the coefficient of 'wife's income' is negative), the average male co-entrepreneur earns a higher income than his average male counterpart (the coefficient of 'husband's income' is positive).

The estimated coefficient of the difference-in-difference for wives is particularly large. Together, the two diff-in-diff estimates for husbands and wives imply that co-entrepreneurial couples not only manage to improve their relative income position while being active as entrepreneurs, they also manage to decrease the earnings difference between the two of them, relative to other couples, because the gain of the wife is materially larger than the gain of the husband (and wives have lower incomes on average and in most cases than husbands). Lower income differences within the household are beneficial.[10] Therefore the higher income gain for wives relative to husbands may be a positive outcome of co-entrepreneurship, unless the wife starts earning more than the husband (Pierce et al., 2013; Bertrand et al., 2013).

Table 5 shows also some non-financial consequences of co-entrepreneurial couples vis-à-vis couples with a single entrepreneur. Co-entrepreneurial couples are not more or less happy than other couples, measured in terms of the use of medications such as anti-depressants or anxiety/insomnia medication. The relationship-related outcomes are also similar for co-entrepreneurial couples and their counterparts: the hazards of separation, divorce, weddings, and childbirths are all the same.

[10] There is direct evidence that couples with lower income differences within the household are happier. Pierce, Dahl and Nielsen (2013) find evidence that Danish husbands use significantly more erectile dysfunction medication the lower is their wives' income, given that they themselves earn more than their wives. Aizer (2010) shows convincing evidence that a lower gap between the incomes of husbands and wives decreases domestic violence.

TABLE 5

Regression results: business and family performance of entrepreneurial couples pre-dissolution

	ENTREPRENEURIAL COUPLES VS COUPLES WITH SINGLE FIRM				
	Coefficient	St error	Obs	Subjects	Failures
Panel A Financial outcomes					
Husband's income[b]	.0252***	.0057	21,673	4,816	
Wife's income[b]	-.0188***	.0027	21,707	4,816	
Husband's income relative to income prior to founding[b]	35.67***	5.887	20,059	4,460	
Wife's income relative to income prior to founding[b]	77.93***	2.370	20,089	4,460	
Household income difference (current relative to prior to founding)[b]	-42.31***	6.148	20,011	4,460	
Panel B Non-financial outcomes					
Stress (either partner)[a]	-.2320	.1439	14,200	3,991	350
Stress (husband)[a]	-.1788	.1711	14,649	4,066	246
Stress (wife)[a]	-,2135	.1801	14,744	4,055	215
Separation[a]	-.1820	.1232	14,869	4,218	510
Divorce (if married at founding)[a]	-.0925	.3302	15,704	4,218	60
Wedding (if cohab at founding)[a]	-.3082*	.1636	10,951	3,415	363
Child birth (if not separated)[a]	.0369	.1280	12,281	3,800	513

All regressions include the following controls: age, education, and unemployment history for both spouses, relationship status, kids dummies, as well as firm age dummies. The regressions for non-financial outcomes also include controls for the incomes of both husband and wife. [a] Exponential regression log relative-hazard form. [b] OLS regression with robust standard errors and cohort dummies. Estimations of wealth have been omitted because given that they may reflect different strategies for rent extraction from the firm during its life time, which may be hard to explain due to the founders' taxation preferences.

Table 6 looks like a copy of Table 5. However the estimates are obtained using the subsample of firms that have dissolved in the observed period, about one third of the total sample. Panel A shows the financial outcomes again. The revealed pattern is similar to the pattern before firm dissolution. Most notable is that wives have improved their relative income position (diff-in-diff) compared to households with a single entrepreneur and compared to the situation before the firm was started up. The same is true for husbands. Again, the estimated coefficient for wives is substantially larger than the coefficient of the husbands. The income inequality in the household has decreased, also after the business has been dissolved and both partners are doing something else. Panel B shows that the non-financial consequences of joint entrepreneurship are not any different after firm dissolution, relative to the comparison group.

5. Discussion

In this section we discuss the results presented in Section 4 in the light of the possible motivations for joint entrepreneurship that were discussed in Section 3.

A. *Opportunity costs.* Table 2 showed evidence for the first motivation: low opportunity costs of one of the spouses is correlated with joint entrepreneurship. We argued that these low opportunity costs might be consistent with labor market mismatching. Indeed we found that wives embarking on a joint firm with their husbands come from a less advantageous labor market position than wives where only one of the two starts a firm. The sample of co-entrepreneurial couples includes a relatively large group of couples with the wife earning a very low income.

In Section 3 we proposed an alternative explanation for this finding: co-entrepreneurial couples may be more traditional and the lower earnings of wives need not be evidence of labor market mismatching. Tables 5 and 6 generate some more insight to discriminate between the labor market mismatching and 'tradition' explanations. These tables show that wives in co-entrepreneurial couples experience a substantial increase in their income. Their business income is higher than their pre-venture income. Moreover, these income gains do not vanish after business dissolution. These observations are more consistent with previous labor market mismatches than with traditional divisions and perceptions of their roles

TABLE 6

Regression results: business and family performance of entrepreneurial couples post dissolution

	ENTREPRENEURIAL COUPLES VS COUPLES WITH SINGLE FIRM				
	Coefficient	St error	Obs.	Subjects	Failures
Panel A Financial outcomes					
Husband's income[b]	.0127	.0092	6,735	1,935	
Wife's income[b]	-.0747***	.0048	6,794	1,942	
Husband's income relative to income prior to founding[b]	29.87***	8.854	6,101	1,752	
Wife's income relative to income prior to founding[b]	74.72***	4.271	6,159	1,760	
Household income difference (current relative to prior to founding)[b]	-44.19***	9.494	6,007	1,736	
Panel B Non-financial outcomes					
Stress (either partner)[a]	.0777	.2390	3,960	1,319	121
Stress (husband)[a]	-.1511	.3267	4,178	1,353	73
Stress (wife)[a]	.2073	.2809	4,140	1,351	81
Separation[a]	.1174	.2174	4,085	1,365	143
Divorce (if married at founding)[a]	3.587	2.360	4,550	1,421	6
Wedding (if cohab at founding)[a]	.3857	.3313	4,285	1,394	54
Child birth (if not separated)[a]	-.1157	.3188	3,100	1,098	101

All regressions include the following controls: age, education, and unemployment history for both spouses, relationship status, kids dummies, as well as firm age dummies. The regressions for non-financial outcomes also include controls for the incomes of both husband and wife. [a] Exponential regression log relative-hazard form. [b] OLS regression with robust standard errors and cohort dummies. Estimations of wealth have been omitted because given that they may be highly affected by the degree to which the founders' face severe debt after failure.

in the household. Hence, we find evidence of co-entrepreneurship associated with low opportunity costs of the wife and labor market mismatching.

B. *Wealth constraints.* As we discussed in Section 3 we find no evidence of wealth constraints as a motivating factor of joint entrepreneurship. Tables 3-6 do not generate any relevant additional insights.

C. *Productivity.* Cautiously we can infer from the results that joint entrepreneurship has productivity advantages relative to comparable firms if we suppose that a small scale of operation is a deliberate choice.[11] Expected profitability levels are similar for co-entrepreneurial firms despite their smaller scale and so are the chances of survival. Moreover, the personal financial consequences of co-entrepreneurial couples are rather positive. Both partners start earning more than before the venture was started up, relative to other entrepreneurial couples. Husbands even start earning more on average than husbands in these control couples. Because income growth is especially large for wives of co-entrepreneurial couples, the income difference between husband and wives shrinks, which can be viewed as another benefit.[12] These benefits do not turn into costs after the joint firm of the couple has been dissolved. On the contrary, even then the relative gains are larger for both spouses, and especially wives, in entrepreneurial couples – compared to the pre-venture period- than for couples in the control group.

We proposed alternative, but not mutually exclusive, mechanisms that could cause higher productivity levels: cohesion, organizational capital and specific investments in organizational or human capital (without any ambitions to discriminate between those). The results suggest that investment in specific human capital are particularly high in the case of co-entrepreneurial couples (due, perhaps, to a lower risk of hold-up based on greater trust and stronger incentives). Investments in specific human capital are often

[11] The results of testing whether co-entrepreneurial couples benefit from any productivity advantages are not as easily interpretable as the other results. The productivity estimates are possibly biased by the endogenous choice for co-entrepreneurship.

[12] The higher income of wives in co-entrepreneurial couples might also be caused by incomes equalization of spouses for fiscal purposes. In that case the observed lower difference is not more than an administrative matter. However, the fact that both the husband and the wife experience income gains, relative to the control group as well as to their prior earnings, is evidence that income smoothing cannot play too large a role.

coupled with and difficult to separate from investments in general human capital. Indeed both seem to be developed by co-entrepreneurial spouses to a greater extent than by couples with a single entrepreneur. Other explanations are difficult to reconcile with the finding that the earnings gain remains also after firm dissolution. Moreover, wives gain, on average, more from the investment than husbands. This could be explained by their lower base levels of human capital and the diminishing returns to human capital investments. This finding is also consistent with labor market mismatching. Thus, co-entrepreneurial wives possibly have developed their human capital better –both in comparison to their husbands as well as in comparison to other wives in entrepreneurial couples and have become more productive by working as an entrepreneur together with their spouse. Moreover, the joint venture has given them the opportunity to better match their human capital to the labor market. Especially with regards to the initial low position in the income distribution, this is an important benefit of co-entrepreneurship, not only in terms of productivity but also in terms of equality.

D. *Non-pecuniary benefits.* We find little evidence of non-pecuniary benefits of joint entrepreneurship. Non-financial outcomes are no better for co-entrepreneurial couples than for others (and financial outcomes are not worse).

6. Conclusion

We have found new and perhaps surprising evidence of substantial benefits of co-entrepreneurship. Given the availability of a unique Danish dataset we had the opportunity to compare an unprecedented large set of co-entrepreneurial couples over an extended period with a large set of similar couples and similar dyadic firms. The richness of the data allowed us to study precisely measured firm-related outcomes as well as personal outcomes, both financial and non-financial. Exploiting this opportunity, we tested four economics based motivations for joint entrepreneurship. We find evidence that joint entrepreneurship is an effective route out of the underdeveloped and underutilized human capital of wives in the lower part of the Danish income distribution.

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