Allocation and Productivity of Time in New Ventures of Female and Male Entrepreneurs

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ERIM REPORT SERIES *RESEARCH IN MANAGEMENT*	
ERIM Report Series reference number	ERS-2005-082-ORG
Publication	December 2005
Number of pages	25
Persistent paper URL	
Email address corresponding author	verheul@few.eur.nl
Address	Erasmus Research Institute of Management (ERIM) RSM Erasmus University / Erasmus School of Economics Erasmus Universiteit Rotterdam P.O.Box 1738 3000 DR Rotterdam, The Netherlands Phone: + 31 10 408 1182 Fax: + 31 10 408 9640 Email: info@erim.eur.nl Internet: www.erim.eur.nl

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RESEARCH IN MANAGEMENT

ABSTRACT AND KEYWORDS	
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Free Keywords	Time Allocation, New Ventures, Gender
Availability	
Classifications	

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IN NEW VENTURES OF FEMALE AND MALE ENTREPRENEURS

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VERSION: time allocation [23 11 2005] JSBM submission.doc

KEYWORDS: time allocation, new ventures, gender

TOPIC JSBM: Women & minority owned enterprises; New venture creation and venture capital

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ALLOCATION AND PRODUCTIVITY OF TIME

IN NEW VENTURES OF FEMALE AND MALE ENTREPRENEURS

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This study investigates the factors explaining the number of hours invested in new ventures, making a distinction between the effect of preference for work time versus leisure time and that of productivity of work time. Using data of 1247 Dutch entrepreneurs, we find that time invested in the business is determined by various aspects of human, financial and social capital, availability of other income, outsourcing, side activities and gender. We show that some of the identified factors relate to preferences and others to productivity. Women appear to invest less time in the business as a result of a range of indirect productivity effects.

Introduction

The availability of human time is a fundamental and scarce resource. Households or individuals can allocate their time to different activities, choosing between production or work-oriented activities yielding financial returns and consumption-oriented activities. Since Gary Becker's (1965) "*A Theory of the Allocation of Time*" a substantial amount of research has been done in this area, both by economists and researchers from other disciplines[1]. Within (labor) economics and occupational choice theory time allocation has been studied mainly within the context of wage or contract labor. Time allocation

* Ingrid Verheul acknowledges financial support of the Fund Schiedam Vlaardingen e.o. and the Trust Fund Rotterdam. An early version of the present paper has been read at the Babson Kauffman Entrepreneurship Research Conference, Strathclyde University, Glasgow, Scotland, June 3-5, 2004.

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[1] Juster and Stafford (1991, p.471/2) argue that in the United States economists are the main contributors, whereas in Europe most of the research on time allocation is done by sociologists, planners and statisticians with an interest in national income accounts.

research has not paid much attention to the distinction between wage-employment and self-employment, even though self-employment is different from wage-employment regarding time use in at least two respects. First, self-employed individuals tend to spend more time in the market than wage-employed individuals (Carrington et al., 1996; Ajayi-Obe and Parker, 2005). Time is one of the main inputs into self-employment and this is the case in particular for new ventures (Lévesque and Schade, 2005; Lévesque and MacCrimmon, 1997; Cooper et al., 1997). The longer working hours among the self-employed may be explained by greater job satisfaction and work demands (Ajayi-Obe and Parker, 2005). Second, self-employed individuals tend to have greater flexibility of working hours than wage-employed individuals.

In the field of entrepreneurship few studies have investigated time allocation decisions. The research in this area focuses upon time allocation decisions within the firm rather than within and outside the firm (McCarthy et al., 1990; Cooper et al., 1997). However, studies by Lévesque and MacCrimmon (1997) and Lévesque and Schade (2005) have dealt with the question how individuals divide their time between leisure and work time, where work time is divided between time spend in the new venture and time spend on a wage job. Lévesque and MacCrimmon (1997) use an analytical approach, introducing a framework describing the optimal time allocation between a wage-job and self-employment, that is not empirically tested. Lévesque and Schade (2005) focus on time allocation decisions of students in economics and business within an experimental setting. The present paper may be seen as extending these studies dealing with time allocation decisions of entrepreneurs in new ventures.

For an entrepreneur the choice between work and leisure time will depend upon both preferences and productivity of work time. The present study investigates the allocation and productivity of work time in new ventures. For these ventures in particular time investment is an important issue, as a series of (usually) new and non-recurrent activities is undertaken, laying the foundation of the firm and securing its viability. Explanatory factors of the preference for work time and the productivity of work time are derived from the literature on time allocation and entrepreneurship. Special focus will be on gender differences. Hypotheses are tested by way of both linear and nonlinear regression analyses.

The structure of the paper is as follows. The next section deals with the factors influencing the preference for work time versus alternative time uses, as well as the factors influencing the productivity of work time. Hypotheses will be formulated for these influences. Subsequently, we provide information on the data source, introduce our model and present and discuss the results of the empirical study.

Determinants of Time Allocation

Time allocation theory distinguishes between different activities an individual can allocate his or her scarce time to. For the purposes of this study we argue that, in addition to investing time in the business, an entrepreneur can spend time outside the business on other (work) activities that limit the time that is available for running the business. This study does not deal with time allocation between these 'outside-of-the-firm' activities, but focuses on explaining the number of hours invested in the business versus that invested in other activities. For ease of presentation we use the term *work time* for time spent in the business and *leisure time* for time spent outside the firm. In our model explaining the number of hours invested in the firm (that is, work time) we control for competing time-consuming activities outside the firm, including a wage-job, family care, running a second firm and schooling. The number of hours invested in the business will be dependent upon the preference for work time versus leisure time and the productivity of work time. Becker (1993) makes a distinction between general human capital, applying to all types of economic activity, and specific human capital, referring to a specific type of activity. We argue that the preference for work time will be influenced mainly by *general* human capital, and the productivity of work time by *specific* human capital, as well as social and financial capital. In subsequent paragraphs the determinants of both the preference for work time and the productivity of work time are discussed and hypotheses are formulated.

Preference for Work Time

In the present section the influence on the preference for work time versus other time uses is discussed, distinguishing between effects of other sources of income, general human capital and a number of controls (that is, firm size, sector and risk attitude).

Revenues and Other Sources of Income. An increase in wage (in case of wage-employment) or revenues per hour (in case of self-employment) may lead to an increase or decrease of working hours, depending upon whether the 'substitution effect' (that is, individuals substitute work for leisure hours when returns to work increase) or the 'income effect' (that is, individuals respond to their higher earnings by consuming more leisure at the expense of working hours) dominates (Blundell and MaCurdy, 1999). In the empirical literature findings are indeterminate. Ajayi-Obe and Parker (2005) show that in response to higher wages both wage-employed and self-employed individuals work fewer hours. However, Biddle and Hamermesh (1990) find that higher wages lead to more market work.

Whereas the substitution effect refers to the productivity of work time, the income effect refers to the preference for work time versus leisure time. To investigate income effects, we do not focus upon revenues from the firm, but upon other income, earned independently of the number of hours invested in the firm (possibly by the spouse). The availability of other income is likely to reduce the preference for working hours (Ajayi-Obe and Parker, 2005). The following hypothesis is formulated:

H1: The availability of other income (than that extracted from the business) negatively influences the preference for work time.

Gender, family responsibilities and part-time work. The number of working hours per person has decreased considerably in the last hundred years (Maddison, 1982; 1987). However, there is a divergence in the development of working hours of men and women. For men working hours have declined, whereas for women they have increased substantially (Killingsworth and Heckman, 1986). Contemporary time allocation decisions also show gender differences. Employment rates (whether measured in terms of number of jobs or hours worked) are still lower for women than for men in most OECD countries (OECD, 2002). Moreover, within any occupation men tend to work longer hours than women (Ajayi-Obe and Parker, 2005). Within self-employment men are more likely to work on a fulltime basis than women (OECD, 1998). The combination of work and family responsibilities tends to be an important motivation for women to engage in self-employment, enabling them to have more flexibility in their use of time (Longstreth et al., 1987). However, the "double assignments" of female entrepreneurs also tends to limit the time they can spend in the business.

It may be argued that gender differences with respect to time investments in the business are largely due to household and childcare activities, preventing women to work fulltime or as many hours as men do. Accordingly, we hypothesize that, when controlled for side-activities (that is, other time-consuming activities including wage-job, family responsibilities and schooling), there is no gender difference with respect to time invested in the business:

H2: Gender of the entrepreneur does not influence the preference for work time (*when controlled for side-activities*).

Because marriage and the presence of children (that is, childcare and household activities) tend to go hand-in-hand it is important to untangle these effects on time allocation preferences. Having a partner (whether or not someone is married) may be expected to have negative influence on the number of working hours of both men and women as partners want to spend time together, time that is drawn away from the job or the business. The following hypothesis is formulated:

H3: Having a partner has a negative effect on the preference for work time.

Age of the entrepreneur. Time allocation decisions are strongly related to age (Juster and Stafford, 1991). Market work of men is highest between the age of 25 and 44 years old and decreases afterwards (Hill, 1985; Blinder and Weiss, 1976). In general we expect the preference for work time to decrease with age as older people may be less ambitious and sometimes have a lower degree of stamina. The following hypothesis is formulated:

H4: Age of the entrepreneur has a negative effect on the preference for work time.

Controls. In the explanation of the preference for work time in the firm the following controls are included: (1) *Number of employees.* The present study focuses upon firm start-ups that are characterized by no or relatively few employees. However, it can be argued that in firms with employees the entrepreneur can delegate tasks and responsibilities (Cooper et al., 1997; Churchill and Lewis, 1983); (2) *Services.* A service business may require a smaller size and less investments in terms of time and effort than a production company or high-tech business, with inherent complex production or technological structures; (3) *Risk attitude.* Individuals with a different attitude towards risk are likely to

also differ with respect to the time they invest in the business. Individuals who are not risk averse are expected to 'go for it' and put in all of their time and effort in the new venture. Das and Teng (1997, p 73) argue that: "Entrepreneurship is widely regarded as risk taking because it is about greater gains and losses as compared to non-entrepreneurial activities".

Productivity of Work Time

In this section we will discuss the influence of human, social and financial capital on the productivity of work time in new ventures. In addition, we will discuss the expected influence of business decisions of the entrepreneur (with respect to outsourcing and technological development) on the productivity of work time.

Human capital. According to human capital theorists (Becker, 1965; Mincer, 1974) knowledge increases the cognitive ability of an individual, resulting in more productive and efficient behavior. Davidsson and Honig (2003) argue that individuals with higher levels of human capital are more self-confident. Human capital has been found to positively influence the performance of entrepreneurial firms (Chandler and Hanks, 1994, 1998; Cooper et al., 1994; Pennings et al., 1998).

Becker (1993) distinguishes between general and specific human capital. Castanias and Helfat (1991; 2001) build on Becker (1993) discriminating between generic, industry-specific and firm-specific skills or knowledge. General human capital influences the extent to which an individual has (had) the opportunity to acquire relevant knowledge, skills and contacts (Cooper et al., 1994). An entrepreneur's education and experience may enhance learning and increase the problem-solving ability of an individual within a given environment (for example, a firm). Indeed, Gimeno et al. (1997) find that formal education positively influences the economic performance of the venture. The following hypothesis is formulated:

H5: Education level of the entrepreneur has a positive influence on the productivity of work time.

According to Cooper et al. (1994) gender can also be seen as a general human capital factor. Like education level, gender "*may serve as a proxy for life experiences and access to networks and other resources that bear upon the prospects for success of individual entrepreneurs*" (Cooper et al., 1994, p.

376). Although the level of education is largely similar for female and male entrepreneurs (Fischer et al., 1993; Birley et al., 1987), men tend to have higher levels of entrepreneurial experience (Fischer et al., 1993; Kalleberg and Leicht, 1991), financial management experience, and industry experience (Fischer et al., 1993; Verheul and Thurik, 2001). In addition, it has been suggested that women do not have equal access to financial and social capital (Fischer et al., 1993; Moore and Buttner, 1997)[2]. Hence, women may be less productive than men because they have had fewer opportunities to acquire different types of capital[3]. However, when controlling for the difference in levels of human, social and financial capital (as well as for venture specific characteristics, such as firm size and sector), we do not expect to find gender differences with respect to productivity of work time. This leads to the following hypothesis:

H6: Gender of the entrepreneur does not influence the productivity of work time (*when controlled for human, social and financial capital*).

Age of the entrepreneur may also be "*picking up some omitted variables measuring the effect of human capital, such as years of work experience*" (Gimeno et al., 1997, p. 772). Younger people often have had less opportunity to build up relevant work experience. On the other hand, older people tend to have lower levels of stamina, are less ambitious and less optimistic about future career opportunities. We expect that the knowledge accumulation of older entrepreneurs does not outweigh the decrease in productivity. The following hypothesis is formulated:

H7: Age of the entrepreneur has a reversed U-shaped relationship with the productivity of work time.

Management-specific knowledge of entrepreneurs built up through earlier experiences increases the probability of pursuing profitable strategies and dealing adequately with management issues (Cooper et al., 1994). It is important to distinguish between management and entrepreneurial experience, the latter referring to experience with starting and running a small firm. It has been found

[2] However, it has also been argued that problems that women encounter with banks is largely due to the type of business they want to start, rather than being a woman (Verheul and Thurik, 2001; Orhan, 2001).
[3] Research has shown that the performance of female-owned firms in terms of profits, revenue growth and employment is below that of male led-firms (Rosa et al., 1996; Carter et al., 1997).

that entrepreneurial experience is an important factor explaining new venture performance, and that management experience is of less importance (Stuart and Abetti, 1990; Gimeno et al., 1997). The following hypothesis is formulated:

H8: Entrepreneurial experience has a positive influence on the productivity of work time.

Entrepreneurs who have worked in the same industry in the past are likely to have a network of relationships with suppliers, customers and distributors, providing them with support and credibility (Cooper et al., 1994). Industry-specific knowledge has proven to be important for new venture performance (Cooper et al., 1994). The following hypothesis is formulated:

H9: Industry experience has a positive influence on the productivity of work time.

Past work experience of the entrepreneur may be relevant for new firm performance, above and beyond industry experience. According to Vesper (1980) entrepreneurs who run firms that are closely related to the activities they did in the past have acquired relevant skills and abilities as well as the appropriate 'prior mental programming'. The following hypothesis is formulated:

H10: The extent to which past work is related to the current activities of the entrepreneur has a positive influence on the productivity of work time.

Financial capital. Financial capital can have a direct effect on productivity through the ability to undertake more capital-intensive or ambitious business strategies, to change courses of actions, and to buy time. Capital-intensive strategies are relatively well protected from imitation and characterized by increased labor productivity. Indirectly, capital investments may enable training and more comprehensive planning, influencing firm performance (Cooper et al., 1994). Cooper and Gimeno-Gascon (1992) report that most studies on the relationship between initial capital and performance find more capital to lead to a higher performance. Hence, we formulate:

H11: The size of the start-up capital has a positive influence on the productivity of work time[4].

[4] We assume that the search for financial capital and the decision to invest a certain amount of capital in the new venture precedes the time allocation decision (that is, how many hours an entrepreneur invests in the business).

Social capital. Social capital refers to the access of an individual to various resources (e.g, capital and market access) through interaction with members of a network (Portes, 1998; Bourdieu, 1986). This network may relate to relationships with family, friends and the community but also to more formal arrangements, such as professional or business networks. Interaction and communication within networks of entrepreneurs may contribute to higher performance of a venture as it enables the exchange of valuable information and other resources[5]. Indeed, Davidsson and Honig (2003) find a strong positive effect of being a member of a business network on early stage firm performance. The following hypothesis is formulated:

H12: Contact with other entrepreneurs has a positive effect on the productivity of work time.

Business Decisions of the Entrepreneur. Business decisions made by the entrepreneur are expected to influence the productivity of work time. The present study focuses on decisions in the field of outsourcing and technological development. It can be expected that an entrepreneur contracts out those activities that are most time-consuming, with which (s)he has little experience or that do not belong to the core business (Quinn, 1992). In this context contracting out will lead to a higher productivity per unit of time. Although it has been argued that firms that engage in outsourcing achieve cost advantages as compared to vertically integrated firms[6], the empirical evidence is limited (Gilley and Rasheed, 2000). The following hypothesis is formulated:

H13: Outsourcing has a positive influence on the productivity of work time.

The application of new technology within the firm is likely to influence the productivity of work time in the firm. Innovation has been argued to stimulate firm performance. Crépon et al. (1998) and Klomp and van Leeuwen (2001) show that the share of sales accounted for by innovative products is

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However, the size of the start-up capital may to some extent be endogenous in the determination of the number of working hours. It is difficult to correct for this within the context of our nonlinear framework.

[5] In this context Davidsson and Honig (2003) refer to *bridging social capital* based on *weak ties*. For a discussion of the importance of weak ties in obtaining resources we refer to Granovetter (1973).

[6] Examples include Bettis et al. (1992), D'Aveni and Ravenscraft (1994), Kotabe (1989), Lei and Hitt (1995) and Quinn (1992).

positively related to productivity[7]. The innovation variable in our study measures the extent to which products or services are based on new technology. The following hypothesis is formulated:

H14: Innovation has a positive influence on productivity of work time.

Controls. In the explanation of the productivity of work time the following controls are included: (1) *Number of employees*. The productivity of work time in a larger firm may be higher as there is room for delegation and specialization and specific tasks are fulfilled by employees who are most qualified to perform them[8]; (2) *Services*. Because the service sector is labor intensive, the productivity of work time in service firms may be lower than in manufacturing and construction firms[9]; (3) *Firm status*. A business can be started from scratch (de novo); it can involve a takeover or a restarted business. It may be expected that takeovers and restarted firms have a higher performance than firms that are started from scratch.

Data Source and Variable Description

To test the model and hypotheses we use data gathered through an extensive and detailed survey of the research institute EIM Business and Policy Research, Zoetermeer, the Netherlands. A total sample of approximately 2000 Dutch entrepreneurs was obtained from the population of Dutch entrepreneurs who started a business in 1994. Of these 2000 entrepreneurs, approximately 1500 are male and 500 are female. This is comparable to the average distribution of female and male entrepreneurs in most OECD-countries (OECD, 1998).

The present study focuses on the first year after start-up and is based upon a sample of 1247 Dutch entrepreneurs (of whom 915 are male and 332 are female). Observations are included for which information on all relevant variables is available. In this study an entrepreneur is the owner or owner-manager of the business. Information is available and used on the number of hours worked, and the characteristics of the entrepreneur and his or her business. Because entrepreneurs are followed during

[7] It may be argued that these studies measure the effect of *successful* innovation.
[8] In large firms the level of red tape (bureaucracy) could present an impediment to efficient and effective operations. Because the present study focuses on new ventures, this effect is not plausible.
[9] Cooper et al. (1994) find that growth is lower for retail firms and firms in personal services.

the subsequent year (1995), information on time allocation and profits one year after start-up is also available.

Table 1 presents the explanatory and control variables included in the present study. In addition to variable descriptions, means and standard deviations are presented. The Hours variable has an average of 3.95, indicating an average number of working hours of about 35 hours a week. The mean value for the Hours variable for female and male entrepreneurs is 3.31 and 4.18, respectively. Hence, on average, we see that men work longer hours than women.

Table 1 here

Model Specification

In our empirical analysis we first test for the effects of the explanatory variables on the number of hours worked in the firm using a linear regression analysis. The variation in the number of working hours across entrepreneurs may reflect the differences in the preference for working hours or differences in productivity of work time. The linear regression analysis does not enable us to distinguish between these different effects and we use a nonlinear regression analysis to disentangle these two effects on the number of working hours.

It is assumed that entrepreneurs maximize their utility, $Max_n U(\pi(n), N-n)$, where *expected* profit (π) is dependent upon the number of hours worked (*n*), and *N* is the total number of hours available per week[10]. Utility is positively influenced by *expected* profit and leisure time ($N-n$). We use the following (logarithmic) equations for the utility and profit function:

1) Utility function: $\ln U = \alpha \ln \pi + (1-\alpha)\ln(N-n)$

2) Profit function: $\ln \pi = \delta + \gamma \ln(n)$

[10] This is a departure from Lévesque and Schade (2004) who assume bounded rationality in the choice for the number of working hours.

We expect that $0 < \alpha < 1$ and that γ is positive (working more hours results in higher profit). Carree and Verheul (2006) derive that the nonlinear expression for the optimal number of working hours for an entrepreneur is as follows: $n_i = \frac{\alpha_i \gamma_i}{1 - \alpha_i + \alpha_i \gamma_i} N + \beta x_i$, where α_i is the individual-specific preference for profit versus leisure time, γ_i is the individual-specific productivity of work time and x_i refers to other (that is, competing) time-consuming activities of an individual. In our analysis we correct for the time spent by the entrepreneur on different side-activities (next to running the business), including wage-employment, family care, running another firm (that is, portfolio entrepreneurship) and schooling. Both an increase in α and γ lead to a higher utility-maximizing number of working hours. The individual-specific preference and productivity are determined by the factors as specified in the hypotheses.

The number of hours work per week (*n*) is categorized from 1 to 7 (see Table 1). The maximum number of hours available per week is assumed to be 100 corresponding to a category code of 10. Hence, we fix *N* at 10 in the nonlinear regression analysis. The model is estimated using nonlinear least squares regression analysis. To ensure identification of the nonlinear regression equation, we choose to fix α_0 at 0.5. Altering this value does not substantially affect the results.

Results

In Table 2 we present the results of both the linear regression analysis, explaining the number of working hours in the firm, and the nonlinear regression analysis, distinguishing between the preference for work time versus leisure time (α) and the productivity of time use (γ). The average value of the estimated α_i and γ_i is 0.37 and 1.44, respectively. For each of the variables included in the analysis we also report the mean value for women and men to allow for the investigation of indirect gender effects (through the other explanatory variables) on time investments.

Table 2 here

Number of Working Hours

From the linear regression results in Table 2 we see that several factors influence the number of working hours in the firm. The side-activities OtherJob and Schooling have a negative effect on the number of hours invested in the firm. In addition, there is some evidence that family responsibilities (FamilyCare) absorb time otherwise spend in the firm. The weak effect of FamilyCare may indicate that family responsibilities also come at the expense of leisure time (vis-à-vis work time). The side activity OtherFirm does not influence the number of working hours. Entrepreneurs with more than one firm may have already taken these additional hours into account when answering the question of how many hours they invest in the business.

The availability of other income (OtherIncome) negatively influences the number of hours worked in the firm. The variables INDexperience, Similarity, StartCapital, Contacts, FirmStatus and Outsourcing all have positive effects on the number of hours invested in the business. People who are risk averse invest less hours in the business and service firms are also characterized by lower time investments. Even when controlled for side-activities, gender appears to have a negative effect on time invested in the business, that is, women invest less of their time in the business than men.

Contrary to what may be expected, the control variable Employees does not influence the number of hours invested in the business. In subsequent sections, dealing with the outcomes of the nonlinear model, we will see that, in fact, the Employees variable has a *negative* effect on preferences and a *positive* effect on productivity, which may explain the absence of an (overall) effect on the number of working hours. Indeed, this shows the importance of discriminating between preference and productivity effects when studying time allocation decisions.

Preference for Work Time

From the nonlinear regression results we see that the preference for work time versus leisure time is determined by several variables. The availability of other income than that generated from the firm (OtherIncome) has a negative impact on the preference for work time. It may be argued that the more an entrepreneur is dependent upon the financial revenues from the firm for subsistence, the higher the preference for investing time in the business. Hypothesis 1 is supported.

There are no significant effects of Partner and Age on the preference for work time. Hypotheses 3 and 4 are not supported. As hypothesized we find that Gender does not have a *separate* effect on the preference for work time. Hypothesis 2 is supported.

With respect to the controls we see that the number of employees (Employees) has a negative effect on the preference for work time. It appears that entrepreneurs hire more employees to be able to delegate some tasks and responsibilities and work fewer hours. Also, people who are risk averse have a lower preference for work time in the business.

Productivity of Work Time

The productivity of work time is to a large extent explained by the amount of start-up capital (StartCapital), the level of industry experience of an entrepreneur (INDexperience), the degree to which current activities are related to past work (Similarity) and contact with other entrepreneurs in networks (Contacts). Hypotheses 9 to 12 are supported. In addition, firms that contract out activities are characterized by a higher productivity than firms that do not engage in outsourcing. Hypothesis 13 is supported. As proposed in Hypothesis 6 we do not find a *separate* effect of gender on the productivity of work time. We did not find significant effects for age, education, entrepreneurial experience and the decision to innovate. No support is found for Hypotheses 5, 7, 8 and 14.

The control variables FirmStatus and Employees are also important in explaining the productivity of work time. A take-over has a higher productivity than new or restarted firms and firms with more employees are characterized by a higher productivity than firms with fewer employees. It appears that a higher number of employees enables delegation of activities to those employees who are best qualified for the job.

Gender Effects

It is striking to see that, even though we controlled for side-activities and other explanatory factors, the linear regression results indicate that women invest less of their time in the business than men. Hence, there is a negative *direct* effect of gender of the entrepreneur on the number of hours invested in the business. In addition, there may be *indirect* gender effects on time investments through

the other explanatory variables. In Table 2 we have included the means of the explanatory variables for both female and male entrepreneurs. On the basis of these means and using chi-square statistics, we find that – as compared to male entrepreneurs – female entrepreneurs on average have less industry experience (INDexperience), their businesses are less similar to previous work (Similarity), they have less capital invested in the business (StartCapital) and are less likely to have contact with other entrepreneurs in networks (Contacts), whereas these explanatory factors all have a positive influence on the number of hours worked. Moreover, we find that female entrepreneurs are more likely to have more access to other sources of income (OtherIncome), are more likely to follow schooling (Schooling) and have family responsibilities (FamilyCare) next to running the business, are more likely to run a service firm (Service), and are more risk averse (Risk Averseness) than male entrepreneurs, while these factors have a negative influence on the number of hours invested. Hence, indirectly the gender of the entrepreneur has a negative impact on the number of hours invested in the business for a range of reasons.

Although gender has a negative *direct* effect on the number of hours worked, it does not have a significant (direct) impact on either the preference for work time or the productivity of work time. However, we find that the average value for the productivity coefficient of time for the female sample is 1.18 as compared to 1.53 for the male sample (and 1.44 for the total sample). There is no such difference in the average value of α (that is, the preference for work time). Average values of α amount to 0.37 for the total and male sample and 0.35 for the female sample.

The difference in average value for γ between female and male entrepreneurs may largely be attributed to negative *indirect* gender effects. Female entrepreneurs have less industry experience (INDexperience), their current activities tend to be less similar to previous work (Similarity), they start with less start-up capital (StartCapital), are less likely to have contact with other entrepreneurs outside regular business contacts (Contact) and have smaller firms in terms of number of employees (Employees). From the nonlinear regression results in Table 2 we can see that these factors all have a positive impact on the productivity of work time.

Expected Profits

The model assumes that entrepreneurs use their knowledge about the extent to which various factors influence the productivity of working hours. In the present section we test whether the expectations of entrepreneurs about the influence of certain factors on their productivity reflects the actual impact of these factors. To test for this we perform a regression analysis using data on profits one year after start-up, that is, in 1995 (reported as estimated by the entrepreneurs). Basis for this analysis is the profit equation, $\ln \pi = \delta + \gamma \ln(n)$, as proposed earlier in this study. We test for the influence of the components of γ_i on profits in 1995 (using 548 observations, n_i measured in 1995)[11].

The final column in Table 2 reports the results of the components of γ_i in the profit equation. Comparing the outcomes of the nonlinear model (that is, estimating expectations of profits) with those of the profit equation (that is, estimating the realization of profits), we see that expectations are not completely fulfilled. Although some factors have a relatively similar impact in both models, we see divergence for others. More specifically, we find that whereas industry experience, contacts with other entrepreneurs and outsourcing have impact in the nonlinear model, their effects disappear for the profit equation. It may be that entrepreneurs think that outsourcing is efficient (enabling them to concentrate on the core business), but that, in fact, outsourcing is relatively expensive while negatively affecting the profits. The absence of an industry experience effect in the profit equation may be attributed to an overestimation of capacities of entrepreneurs with industry experience, running the risk of being overconfident and not adequately adapting to industry developments. Also, whereas entrepreneurs expect their contacts with other entrepreneurs to be of value, in reality the revenues of networking seem to be negligible. Conversely, we see effects of gender, services and innovation appear in the profit equation. For gender and services competition between the preference and productivity effects may have contributed to the divergence of findings in the nonlinear and the profit model.

[11] One year after start-up entrepreneurs were asked about their profit. Positive profits are registered as a categorical variable, made up of 9 classes (that is, fl.0-10.000; fl.10.000-25.000; fl.25.000-50.000, etc.). We use the mid-point of these classes (that is, fl.5.000; fl.17.500; fl.37.500, etc.) as an estimate for profit. For entrepreneurs who indicated that they played even a value of fl.2.500 is used. Those who reported a loss are not incorporated in the data set. According to long-run expectations negative profits can not exist (otherwise the entrepreneurs would have never started in the first place). fl. denotes the Dutch guilder which was equivalent with about half a Euro in the later 1990s.

Discussion and Conclusion

The present study has started from the notion that time is an important resource for entrepreneurs, in particular for entrepreneurs in new ventures. There have not been many studies investigating time allocation decisions of self-employed individuals (distinguishing between work time within the firm and time spent outside the firm). In addition to studying influences on the number of working hours (using a linear model), the present study also explicitly distinguishes between preference and productivity effects on the number of working hours (using a nonlinear model). Preference effects occur through having other income available (next to that generated from the firm), the size of the firm (in terms of number of employees) and risk attitude. According to our model the productivity of time invested in the new venture is dependent upon factors such as industry experience and experience with related activities, start-up capital, networking, outsourcing, firm size and type of business start-up (that is, taken over or started from scratch). The expectations of the entrepreneurs about which factors influence their productivity do not completely coincide with their actual impact.

A separate test investigating influences on the actual level of profits indicate that the most important factors explaining productivity include the amount of start-up capital, firm size, sector and whether the business is taken over or newly founded. Interestingly, gender and innovation have a negative effect on productivity. Innovations are risky as they have a high chance of failure. Indeed, Timmons (1986) argues that a high failure rate for innovations is rule rather than exception. The negative *direct* effect of gender on profits may indicate that there are other factors that influence productivity (and are related to gender) which we have not been able to include in the analysis.

The importance of making a distinction between preference and productivity effects becomes apparent from the effect(s) of firm size (as measured by the number of employees). We have seen that firm size does not have an overall effect on the number of working hours (in the linear model). However, studying the effect of firm size more closely, we see that the absence of a size effect can be attributed to a balancing out of a negative size effect on preferences and a positive size effect on productivity. In the present study the classification of explanatory factors as either ‘preference’ or

'productivity' factors (with the exception of gender, firm size and sector) are derived from theoretical considerations in the literature.

The present study finds evidence for several gender effects. A distinction is made between total, direct and indirect gender effects to create more insight in the way gender of the entrepreneur can influence time allocation decisions. *Total* gender effects refer to *average* differences between women and men with respect to time issues. We have seen that on average women work fewer hours in the business than men (that is, mean for the *Hours* variable is 3.31 for women and 4.18 for men); the preference for work time on average is similar for women and men (that is, average value for α is 0.37 for men and 0.35 for women); and the productivity of work time on average is lower for women than for men (that is, average value for γ is 1.18 for women and 1.53 for men).

Direct gender effects refer to gender differences in time allocation, preferences and productivity when controlling for a range of other factors[12]. These effects can be considered residual effects because of omitted factors that relate to both gender and time allocation. From the linear regression analysis we have seen that there is a negative direct effect of gender on working hours, that is, when controlled for a range of other factors, women work fewer hours than men do. From the nonlinear regression analysis we have seen that there are no direct effects of gender on either preferences or productivity. However, we find a negative direct gender effect in the separate profit equation. The lower profit levels in female-controlled firms may reflect their ambitions, as women are more likely to value quality and pursue other goals that are not directly related to financial performance (for example, Brush, 1992; Rosa et al., 1996; Verheul et al., 2002).

Indirect gender effects refer to differences in time allocation decisions and productivity of work time that can be attributed to differences between women and men with respect to the other explanatory variables. We find negative indirect effects of gender on the number of working hours, and on both preferences and productivity. For instance, we find that women have a lower productivity per time unit because they have less industry experience, they start a business that is not related to previous work, they start with less capital, spend less time on networking, and have smaller firms. This finding

[12] Direct gender effects are the effects of gender as presented in Table 2.

corresponds with that of Collins-Dodd et al. (2004) who report that performance differentials across gender are negligible when controlled for a range of practice and personal factors.

From a practitioners standpoint it is important to understand why female entrepreneurs display lower productivity levels (per time unit) than male entrepreneurs. If (local) policy makers find ways to increase the productivity in firms led by women by way of increasing human, social and financial capital levels, this may raise the economic performance of these firms, as well as that of the regions within with these firms are established. The present study suggests that productivity in female-led firms can be increased through different mechanisms, for instance by stimulating women to acquire relevant experience prior to starting up their own firm and stimulating them to become member and take part in networks where they can learn from the experiences of other entrepreneurs. With respect to networking it may be argued that, because women still tend to take on the bulk of household and/or childcare responsibilities, they have limited time to spend on networking. Indeed, increasing access to affordable childcare facilities tailored to the needs of female entrepreneurs is an important policy issue in Europe.[13]

[13] See European Commission (1999). For example, most of the day-care centers in the Netherlands are relatively expensive (in particular for female entrepreneurs who do not have an earning partner) and fail to have flexible opening hours (Mandos et al., 2001).

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TABLES

Table 1: Description of variables

Variable name	Variable description	Mean	Stdev
Hours	Number of hours invested in the firm in 1994 [1=<10; 2=10-19; 3=20-29; 4=30-39; 5=40-49; 6=50-60; 7=>60]	3.95	2.05
OtherIncome	Do you or your partner have other sources of income? [0=no; 1=yes]	0.74	0.44
OtherJob	Do you have another (wage) job besides running the business? [0=no; 1=yes]	0.27	0.44
OtherFirm	Do you run another firm besides running the business? [0=no; 1=yes]	0.04	0.19
FamilyCare	Do you have family responsibilities besides running the business? [0=no; 1=yes]	0.10	0.30
Schooling	Do you take schooling besides running the business? [0=no; 1=yes]	0.06	0.24
Gender	Are you male or female? [0=male and 1=female]	0.27	0.44
Partner	Do you have a partner? [0=no partner; 1=partner]	0.81	0.39
Age	Age in categories [1=<20; 2=20-24; 3=25-29; 4=30-34; 5=35-39; 6=40-44; 7=45-49; 8=50-54; 9=55-59; 10=>60]	4.69	1.80
Education	What is your highest level of education? [1=average secondary education; 2=higher secondary education; 3=low-level vocational training; 4=*Leerlingstelsel**; 5=mid-level vocational training; 6=high-level vocational training, 7=university]	4.34	1.85
ENTexperience	Did you run a business prior to the start-up of this firm? [0=no; 1=yes]	0.07	0.25
INDexperience	What is the degree of industry experience you have? [1 {very weak} to 5 {very strong}]	3.88	0.94
Similarity	Are your current activities related to past work? [1 {no} to 3 {almost identical}]	2.02	0.77
StartCapital	What is the total amount of start-up capital? [1=,<*fl*.10.000; 2=*fl*.10.000-*fl*.25.000; 3=*fl*.25.000-*fl*.50.000; 4=*fl*.50.000-*fl*.100.000; 5=*fl*.100.000-*fl*. 250.000; 6=*fl*.250.000-*fl*.500.000; 7= >*fl*.500.000]**	2.16	1.45
Contacts	Do you have contacts with other entrepreneurs beyond regular business contacts in networks? [1 {never} to 3 {regularly}]	1.58	0.71
Employees	How many employees do you have in 1994?***	0.35	1.56
Service	Do you run a service firm? [0=no; 1=yes]	0.50	0.50
Innovation	Are your products/services based upon new technology that has not been used until 3 years ago? [1 {practically not} to 4 {almost completely}]	1.54	0.87
FirmStatus	What is your firm's status? [1=new firm; 2=restart existing firm; 3=take-over]	1.25	0.63
Outsourcing	Are certain activities within the firm contracted out? [0=no; 1=yes]	0.45	0.50
Risk averseness	To what extent do you like to take risk [1={very high} to 5 {very low}]	2.21	0.80

* In the 'Leerlingstelsel' students go to school for 1 day a week and work during the rest of the week (that is, a minimum of 20 hours); ** StartCapital is measured in Dutch guilders (florin). One guilder is equal to 0.45378 Euro; *** The number of employees is measured in terms employees that work fulltime, that is, more than 32 hours per week.

Table 2: Linear and nonlinear regression results

Variables	Mean Variables		Linear model (Hours)	Nonlinear model (Hours)		Profits
	Male	Female		Alpha (α)	Gamma (γ)	
Constant			3.064***	0.5	-0.068	-0.231
OtherIncome	0.70	0.84	-0.634***	-0.063***	.	.
Gender	0	1	-0.407***	-0.011	-0.148	-0.325***
Partner	0.80	0.85	0.123	0.013	.	.
Age	4.76	4.49	-0.002	-0.006	0.014	0.013
Age_sq	25.96	23.05	-0.007	.	-0.002	0.000
Employees	0.42	0.16	0.016	-0.012***	0.269***	0.044**
Services	0.47	0.56	-0.492***	-0.045	-0.0005	0.205**
Risk averseness	2.17	2.31	-0.181***	-0.017***	.	.
Education	4.36	4.30	0.040	.	0.019	0.041*
ENTexperience	0.07	0.04	0.185	.	0.111	-0.198
INDexperience	3.92	3.76	0.148***	.	0.057**	0.058
Similarity	2.08	1.84	0.173***	.	0.087**	0.105*
StartCapital	2.26	1.87	0.281***	.	0.178***	0.061**
Contacts	1.61	1.50	0.148**	.	0.078**	0.024
Innovation	1.58	1.41	0.010	.	-0.003	-0.112**
FirmStatus	1.25	1.23	0.366***	.	0.275***	0.212***
Outsourcing	0.46	0.41	0.415***	.	0.230***	-0.007
OtherJob	0.27	0.26	-1.273***	-1.235***		.
OtherFirm	0.04	0.03	-0.276	-0.343		.
FamilyCare	0.03	0.29	-0.316*	-0.282*		.
Schooling	0.05	0.10	-0.706***	-0.718***		.
R^2			0.448	0.458		0.297

Note: the dependent variable is Hours for the (non)linear Hours models. The dependent variable for the profit model (in the final column) is the logarithm of reported profit (in 1995). Unstandardized coefficients are presented.
*, ** and *** represent significance at the 0.10, 0.05 and 0.01 levels, respectively.

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