

BALANCED SKILLS AMONG NASCENT ENTREPRENEURS

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ABSTRACT

This paper examines the effects and origins of balanced skills among nascent entrepreneurs. In a first step we extend Lazear's jack-of-all-trades theory to formally model performance effects of balanced skills. In a second step we investigate potential sources of balanced skills related to the investment hypothesis and the endowment hypothesis. Analyzing data on 100 high-potential nascent projects, we find support for the hypothesis that balanced skills are an important factor for making progress in the venture creation process. Interestingly, none of the traditional human capital indicators such as prior managerial and entrepreneurial experience predict the progress of the project. However, they contribute to a balanced skill set, supporting the investment hypothesis on balanced skill origins. We also find empirical evidence for the endowment hypothesis suggesting that a balanced skill set is deeply rooted in the adolescent development and personality characteristics of the nascent entrepreneurs.

Keywords: Balanced Skills; Nascent Entrepreneurship; Human Capital; Entrepreneurship

INTRODUCTION

It is widely acknowledged that entrepreneurship is a key driver for economic development. Entrepreneurship is regarded as an important mechanism for the diffusion and exploitation of knowledge (e.g. Acs & Plummer 2005). Some scholars highlight the importance of entrepreneurship for economic growth. It is argued that new ventures challenge incumbents thereby amplifying structural change and securing market efficiency thereby leading to an improved overall competitiveness of the economy and subsequent growth (Fritsch & Mueller 2004).

One important stream in the literature on entrepreneurship in general and new venture creation in particular focuses on the characteristics of the entrepreneur. However, early research on individual differences – mostly in personality traits – has been heavily criticised mainly because of the lack of a theoretical framework on how personality traits affect entrepreneurial behavior (Gartner 1988; Rauch & Frese 2006). As a consequence, research attention has shifted mainly towards resources such as the amount of human and social capital individuals contribute to the emerging venture (e.g. Samuelsson & Davidsson 2009; Mosey & Wright 2007). The present paper primarily focusses on human capital, its origin and its impact on entrepreneurship. Thus, it is in line with the tradition of Theodore W. Schultz (1980), who discusses the demand and supply of "entrepreneurial ability" in society. According to him, entrepreneurial abilities are not equally distributed among individuals. Instead, those abilities are scarce and thus valuable, and can be both innate and/or acquired.

While this is the general line we follow, we study the jack-of-all-trades view on entrepreneurship in particular. Lazear (2005) notes that entrepreneurs must be sufficiently skilled in a number of areas, because they have to combine different resources such as physical capital, people and ideas in order to successfully run a business. Previous research on the jack-of-all-trades view of entrepreneurship has primarily focussed on vocational choice (e.g. Lazear 2005; Silva 2007; Wagner 2003). However, Lazear's theory can be extended to derive performance predictions of a balanced skill set which have not been investigated thoroughly yet (see for notable exceptions Oberschachtsiek, in press; Åstebro and Thompson 2007). To our best knowledge, there is no empirical study investigating performance effects of balanced skills in a nascent entrepreneur context.

Furthermore, knowledge about the origins of a balanced skill set is very limited and subject to disagreement among scholars. There are two competing explanatory models explaining variation in the skill set of individuals. On the one hand, the investment hypothesis states that individuals *invest* in a balanced skill set deliberately by engaging in different industries and working in a range of jobs to acquire skills for starting up a business (Lazear 2005). On the other hand, the endowment hypothesis questions the purpose of skill acquisition among entrepreneurs. Instead, scholars posit that other factors such as a “taste for variety” drive the skill accumulation process (Åstebro and Thompson 2007) or an *innate endowment* with a high level of multiple skills enables individuals to engage in many different roles in the labour market – including entrepreneurship (Silva 2007).

In view of this research gaps, this paper examines the effects and origins of balanced skills among nascent entrepreneurs. First, we extend Lazear’s jack-of-all-trades theory to formally model performance effects of balanced skills. Second, potential sources of balanced skills are explored. Regarding the investment hypothesis, we raise the question of whether a balanced skill set is the result of an individual’s investment strategy, which might encompass prior entrepreneurial experience or prior work experience in young and small companies. With respect to the endowment hypothesis, we draw on findings reported in the psychological literature on entrepreneurship. We investigate whether a balanced skill set might be rooted in the personal development of the entrepreneur and whether skill accumulation may be unintentionally driven by personality traits.

The remainder of our paper is organized as follows. In the next section, we present a formal model on how balanced skills affect entrepreneurial performance and set out the respective hypotheses. Section 3 is dedicated to the data presentation and the variables used to test the hypotheses. The empirical analysis is presented in Section 4. Section 5 discusses the findings and Section 6 concludes.

THEORETICAL BACKGROUND

Impact of Balanced Skills on Entrepreneurial Performance – A Formal Model

In a recent paper, Lazear (2005) proposed a model of vocational choice that gained some consensus in the scientific community. When facing a decision between entrepreneurship and paid employment, those individuals with a balanced skill set are more likely to opt for self-employment (Åstebro & Thompson 2007; Lazear 2004; Lazear 2005; Silva 2007; Wagner 2003; Wagner 2006). We extend Lazear’s approach to derive performance implications for those individuals who have chosen entrepreneurship. Because our extension is based on the original model it might be instructive to briefly review his formal approach.

Let there be two activities – entrepreneurship and paid employment – for an individual to earn a living. In each activity earnings depend on the productive use of two skills whose levels (before vocational choice) are denoted by x_1 and x_2 . At the beginning we assume both skills to be independent from each other. Every individual is endowed with a pair (x_1, x_2) , whereby $g(x_1, x_2)$ is the joint density of both skills.

As an employee the individual may specialise in one skill to earn

$$w_S = \max[x_1, x_2], \quad (1)$$

while as an entrepreneur his earnings are limited by the weakest skill

$$w_E = \lambda \min[x_1, x_2]. \quad (2)$$

Lazear (2005) terms λ as a market-determined premium to entrepreneurship that is endogenously defined within the model so as to equate supply and demand. The decision to become an entrepreneur is based on a comparison of the earnings. Individuals choose entrepreneurship as long as $\lambda \min[x_1, x_2] > \max[x_1, x_2]$. The weaker skill must exceed a minimum level otherwise the individual becomes a specialised employee. This can also be seen in Figure 1, where the individual decision, its conditions and outcomes are depicted.

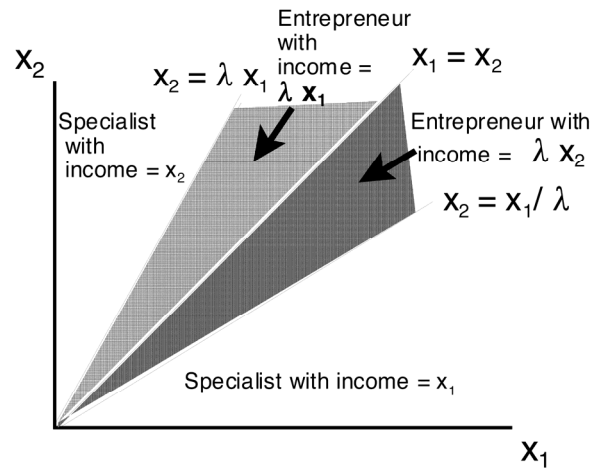


Figure 1: The impact of balanced skills on vocational choice. Source: Lazear (2005).

Given the distribution of the skills, the probability of an individual becoming an entrepreneur is equal to both shaded areas in Figure 1 or in mathematical terms

$$Pr ob = \int_0^{\infty} \int_{x_1/\lambda}^{\lambda x_1} g(x_1, x_2) dx_2 dx_1 . \quad (3)$$

For those individuals who become entrepreneur Lazear's theory also has – although not formally modelled by himself – some specific income implications. In our extension of the model¹, the expected earnings of an entrepreneur is given by

$$E(w_E) = \int_0^{\infty} \int_{x_1/\lambda}^{\lambda x_1} w_E g(x_1, x_2) dx_2 dx_1 . \quad (4)$$

As a next step the assumption of independence of the skills is relaxed and the possibility of balanced skills is introduced. The income equation of the entrepreneur in (2) already contains the intuition. Only if the entrepreneur is sufficiently good in both skills will he be able to set up a successful business, since his earnings are limited by the weaker skill. To be a jack-of-all-trades should thus pay for entrepreneurs.

In formal terms, let x_2 depend upon x_1 and a different factor v such as

$$x_2 = \rho x_1 + (1 - \rho)v , \quad (5)$$

where $\rho \in [-1, 1]$ denotes the correlation between both skills, and $f(x_1)$ and $h(v)$ are density functions of x_1 , respectively v . In order to incorporate the balanced skills notion into the earning equation in (4) one has to use a standard change of variables and alter the limits of integration to obtain

$$E(w_E) = \int_0^{\infty} \int_{[(x_1/\lambda) - \rho x_1]/(1-\rho)}^{(\lambda x_1 - \rho x_1)/(1-\rho)} w_E(x_1, v) f(x_1) h(v) dv dx_1 . \quad (6)$$

Finally, we differentiate this equation with respect to ρ . Because the min-function in (2) cannot be differentiated, we split the integral into two parts. In Figure 1, the income function is given by $w_E(x_1) = \lambda x_1$. for points above the 45° line ($x_2 > x_1$). For points below the 45-degree line ($x_1 > x_2$), entrepreneurial income is given by $w_E(x_1, v) = \lambda x_2 = \lambda[\rho x_1 + (1 - \rho)v]$. Reorganisation of the integral limits yields equation (7a) for points below the 45 degree line, and (7b) for points above the 45-degree line:

$$E(w_E) = \int_0^{\infty} \int_{x_1}^{(\lambda x_1 - \rho x_1)/(1-\rho)} w_E(x_1) f(x_1) h(v) dv dx_1 , \quad (7a)$$

$$E(w_E) = \int_0^{\infty} \int_{\lfloor (x_1/\lambda) - \rho x_1 \rfloor / (1-\rho)}^{x_1} w_E(x_1, v) f(x_1) h(v) dv dx_1. \quad (7b)$$

Differentiating both equations with respect to ρ and denoting UL as the upper limit, respectively LL as the lower limits of the inside integral, yields

$$\frac{\partial E(w_E)}{\partial \rho} = \left[\int_0^{\infty} h(UL) \lambda x_1 \frac{x_1(\lambda-1)}{(1-p)^2} - 0 \right] f(x_1) dx_1, \quad (8a)$$

$$\frac{\partial E(w_E)}{\partial \rho} = \left[\int_0^{\infty} 0 - h(LL) x_1 \frac{-x_1(1-1/\lambda)}{(1-p)^2} \right] f(x_1) dx_1. \quad (8b)$$

Both equations are positive upon the condition $\lambda > 1$, which is always given according to Lazear (2005). Thus, theory predicts a more balanced skill set of the entrepreneur to be associated with higher earnings leading to the following hypothesis:

H1: Balanced skills among nascent entrepreneurs are positively associated with nascent entrepreneurs' earnings.

Origin of Balanced Skills

The efforts to empirically test the jack-of-all-trades theory have sparked a controversy. Where do balanced skills come from? As indicated above, there are two opposing schools of thought: the idea of investment versus endowment. On the one side, the investment hypothesis states that individuals *intentionally* invest in a balanced skill set by engaging in different industries and working in different jobs to acquire skills for starting up a business later (Lazear 2005). On the other side Silva (2007) found no evidence for a causal and intentional relationship between skill acquisition in one employment spell and entrepreneurial activity in the following employment spell when controlling for time-fixed individual unobservables. Accordingly, he argues that a jack-of-all-trades “attitude only matters as an innate attribute” (p. 122) leading to an *endowment* of entrepreneurs with multiple skills – a view Lazear (2005) only found limited support for. Such an accumulation of skills was labeled *unintentional* as it seems to be driven by individual characteristics which might also impact the decision whether or not to become an entrepreneur. In the following, different factors from each approach will be considered as predictors for a balanced skill set.

Factors Associated with the Investment Hypothesis

Human capital theory (Schultz 1980; Brüderl et al. 1992) argues that investment in entrepreneurial skills and abilities pay off in terms of surviving, profitability and progress. If a balanced skill set is the outcome of an investment strategy of nascent entrepreneurs, occupational history should reflect work and schooling experience fostering the acquisition of various experiences. A review of the literature revealed four possible routes to acquiring a balanced skill set.

First, previous self-employment can be considered as a natural source of a balanced skill set. It is well known that previously self-employed individuals represent a high proportion of business founders (e.g. Evans & Leighton 1989). Because an entrepreneur has to deal with various tasks such as talking to customers, product or service development, and raising financial funds (Lazear 2005), past entrepreneurial experience might therefore be seen as the best training to gain specific knowledge and skills in various fields, which are then most productively applied in later entrepreneurship.

Second, managerial experience should make it more likely to acquire a balanced skill set. Irrespective of whether the managers role is organisational long-term planning (Willmott 1987) or day-to-day management of a multitude of people and tasks (Mintzberg 1973), it seems reasonable that “of all job grades, managers will have the greatest exposure to work experience which spans diverse tasks” (Parker 2009, p.485).

Third, work experience in young and small firms – as opposed working in a large or established firm – makes the acquisition of a balanced skill set more likely. Because small (and especially young and small) firms usually lack complex hierarchical structures and highly-specialised work places, working

conditions are characterised by the opportunity for employees to conduct a variety of tasks (Parker 2009).

Fourth, besides on-the-job training, formal education can also contribute to a balanced skill set. Lazear (2004, 2005) shows that students with a balanced university curriculum acquire the necessary knowledge to work in different jobs and industries. These students were also more likely to enter entrepreneurship.

Taken all into account, we apply the following set of hypotheses:

H2a: Prior entrepreneurial experience is positively associated with a balanced skill set.

H2b: Prior managerial experience is positively associated with a balanced skill set.

H2c: Prior work experience in young and small firms is positively associated with a balanced skill set.

H2d: Prior variety in university curricula is positively associated with a balanced skill set.

Factors Associated with the Endowment Hypothesis

In contrast to a directed acquisition of a balanced skill set, individuals may also possess such resources through unintentional, predetermined factors - individual characteristics that may feed into a balanced skill set and the decision of whether or not to become an entrepreneur at the same time. A review of the literature on vocational choice reveals that personality traits and characteristics of an individual's personal development may be associated with such unintentional skill accumulation.

First, the role of personality for vocational behavior has often been studied (e.g. Holland 1985). Recent empirical findings indicate that especially three Big Five traits - openness to experience, extraversion, and agreeableness - affect job mobility (e.g. Wille et al. 2010) and might therefore be seen as a cause for unintentional skill accumulation.

Openness to experience is seen motivationally in the need for variety and experience for personal benefit (McRae & John 1992). Adjectives such as curious, imaginative, and widely interested are often used to describe people with high openness to experience. The link between the openness trait and a balanced skill set can be seen in the possibility of gaining new experience by changing jobs (e.g. Ng et al. 2007). Thus, we expect people with a high openness to enjoy the possibility of working in different areas and to switch jobs more often, thereby making them more likely to acquire a balanced skill set.

Extraversion concerns individuals' engagement with the external world. People with high extraversion level can be described as active, enthusiastic, outgoing and energetic (McCrae & John 1992). Vinson et al. (2007) report some extraversion related traits to be correlated with job switching behavior. They argue that extraverted people 1) have larger job-related networks providing them with more job alternatives to act on (Granovetter 1985), and 2) have the necessary confidence and social expertise to pursue potential employers making job switching more likely. Taken all into account, we expect people with high extraversion to be more likely to switch jobs resulting in a balanced skill set.

Agreeableness can be summarized as individuals' preference to social interactions. People scoring low on agreeableness can be characterized as self-centered and indifferent to and jealous of others (Digman 1990). Wille et al. (2010) argue that such people are less sensitive to interpersonal connections making it easier for them to cope with the loss of social relations when switching companies. Additionally, employers might be less interested in keeping such employees, because of their negative impact on work performance in teams (Peeters et al. 2006). In sum, we expect people with low agreeableness to switch jobs more often, leading to a more balanced skill set.

Based on the discussion above, we expect individuals with a specific manifestation of traits – high openness and extraversion as well as low agreeableness – to switch jobs more often, making it more likely to acquire a balanced skill set over the course of their career. Note that this specific manifestation of traits also has been associated with entrepreneurial intentions (Obschonka et al. 2010). Thus, the corresponding set of hypotheses applies:

H3a: A higher level in openness to experience is associated with a balanced skill set.

H3b: A higher level in extraversion is associated with a balanced skill set.

H3c: A lower level in agreeableness is associated with a balanced skill set.

Second, the course of personal development can be expected to be associated with vocational variety and a balanced skill set. The central assumption in developmental psychology is that past interests and actions are reflected in future choices (Holland & Nichols 1964). Applying this framework, adolescents' *early interests* have been related to the process and the result of vocational choice (e.g. Hong et al. 1993; Schmitt-Rodermund & Vondracek 1999) as they provide a first opportunity for adolescents to explore occupation-related activities and to develop initial skills and competencies (Super 1984).

Applying this framework, we argue that adolescents with a variety of early interests have a broader range of vocational interests – though arguably at a lower level of intensity and ability – and subsequently a higher probability to engage later in different occupations and industries. Support for this line of reasoning can be found in the literature on giftedness. Milgram and Hong (1999) report that among highly gifted adolescents in Israel those with an undifferentiated skill set (not concentrated towards one particular domain) had less differentiated vocational interests. Taken together, according to the endowment hypothesis a balanced skill set should be already reflected in varied early interests in adolescence.

H4: Higher variety in early interests at adolescence is positively associated with a balanced skill set.

DATASET AND METHODS

Dataset

The data for our analysis are provided by the Thuringian Founder Study (*Thüringer Gründer Studie*), an interdisciplinary research project on success and failure of innovative new ventures in the German federal state of Thuringia. One part of this study is a sample of “high-potential” nascent projects. In this respect this paper contains the analyses of the first wave of data.

We view entrepreneurship as the creation of economic value within emerging ventures (Davidsson et al. 2001, Shane & Venkataraman 2000). According to this definition, the creation of value is not limited to tech-based new ventures, but also includes innovative activity in the service sector. Building a sample of high-potential nascent projects consistent with this broad definition is in line with previous work using PSED data sets. In particular, the research team of the Thuringian Founder Study followed the lead of the CAUSEE project that studies the emergence of regular and high-potential nascent projects in Australia (Davidsson et al. 2008). Thereby, high-potential nascent projects are identified via a multitude of sources to minimise the bias which would occur when focussing on a single source. Constructing the dataset of this paper comprised three steps.

First, possible sources for identifying high-potential nascent projects were assessed. The most important sources were the random samples of scientists and innovative young companies constructed within the Thuringian Founder Study. Another source of high-potential nascent projects were public business consultants, technology transfer offices of universities, business angels, and venture capitalists. The research team also visited elevator pitches to get in contact with high-potential nascent projects. Further sources of high-potential nascent projects were interviewed nascent entrepreneurs who indicated to know other founders, and personal contacts from members of the research team. All in all, using these different sources 364 suspected high-potential projects could be identified.

The second step of the procedure comprised a customised screening procedure to separate high-potential from non-high-potential projects. Quite similar to the CAUSEE project in Australia (Davidsson et al. 2008), all suspected high-potential nascent projects were rated by a combination of criteria related to a) human capital of the entrepreneurs (management experience, start-up experience and starting as team), b) sophistication level of the project (e.g. scientist sample: relation of the idea to own research; others: novelty of the product / service, or production process, or methods of promotion and selling), and c) belonging to a growth-friendly industry (e.g. sample of young companies: operating in a growing market; specific industries). The projects were coded for each criterion as 1 for

low, 2 for medium, and 3 for high level. In sum, 232 cases that reached the predefined score of 6 points qualified for the main interview.

In a third step, the research team contacted the respective founders. We were able to conduct 152 structured face-to-face interviews with the solo entrepreneur or leading entrepreneur of the project (from July 2008 to May 2009) resulting in a response rate of 66%. The interviews took on average one and a half hour. Some of these projects were already abandoned at the time of the interview. A couple of other projects were already “complete” firms (in terms of having registered in an official business register and having obtained monthly positive cashflows). Since these cases are not nascent projects according to the usual standards in nascent entrepreneurship research, we solely focus on the remaining 100 projects in gestation. Due to a number of exclusions as an outcome of missing data the analysed sample consists of 95 projects.

The structured interviews covered a broad set of questions regarding socio-demographic and psychological data of the founders as well as the project. Some of this data trace back to founders adolescents and are therefore subject to memory decay (Davidsson 2006). To ensure data validity the research team utilized mnemonic techniques drawn from the Life-History-Calendar method (Caspi et al. 1996).

Dependent Variables – Nascent Project Progress and Balanced Skills

In the first part of the empirical analysis we try to explain variance in the earnings of nascent entrepreneurs. Since these projects are by definition still in gestation we use making *progress* operationalized as the sum of gestation activities (such as writing a business plan, organising a start-up team, acquiring financial capital) in the venture creation process as dependent variable. Prior research has shown that progress be a valid ex-ante indicator for entrepreneurial performance (e.g. Brush et al. 2008).

The second part of the analysis deals with the origins of the nascent entrepreneur’s balanced skill set. As an indicator for balanced skills we use the *variety of functional background* of the entrepreneurs which is measured by the number of functional areas in which they gained work experience prior to the first gestation activities (6 possible categories such as R&D, marketing/sales, accounting/financing, production). Similar measures have been successfully used in previous research studying the jack-of-all-trades hypothesis (Wagner 2006; Lazear 2005).

Although the majority of high-potential projects are usually initiated by teams, we chose the individual as the level of analysis, because Lazear’s theory is also formulated at the individual level. Accordingly, most explanatory variables relate to the interviewed entrepreneur and not to the start-up team as a whole.

Explanatory Variables – Nascent Project Progress

The major explanatory variable in the first part of the analysis is the *variety of functional background*, indicating a balanced skill set. The dataset offers the opportunity to control for other factors explaining nascent project progress. Nascent entrepreneurs’ human capital is one of the most researched success factors. Thus, we control for years of prior *entrepreneurial experience* and years of prior *managerial experience* (e.g. Tornikowski & Newbert 2007; Shane & Delmar 2004). We also control for the *variety in university curricula* of the entrepreneurs (count of fields such as natural sciences and medicine, engineering, business administration in which the entrepreneur had studied) and whether the entrepreneurs had prior *work experience in young and small firms*.

Research has shown that social capital affects progress in the venture creation process (e.g. Davidsson & Honig 2003). Hence, we include a dummy variable to measure whether the interviewee knew *entrepreneurs* as a control variable. As another indicator for social capital, we account for *public advice* from public consulting (count variable indicating the number of fields with advice) in trade chambers and technology transfer offices of universities (e.g. Parker & Belghitar 2006).

Also, following past research in nascent entrepreneurship (Samuelsson & Davidsson 2009; Parker & Belghitar 2006), we include control variables referring to the *time invested* (number of months full-time work on the project) and the *financial capital invested* (in 1,000 Euros) by the founders into the project, the *time since initiation* (in months) of the project, and *team size*. We finally control for

possible differences between industrial and *service projects* and the *industry* sector. Note that the controls described in this paragraph are assessed at the level of the project.

Explanatory Variables – Balanced Skills

In the second part of the analysis we focus on origins of balanced skills among nascent entrepreneurs. Main explanatory variables related to vocational background of the entrepreneurs are prior *entrepreneurial experience*, prior *leadership experience*, *variety in university curricula* of the entrepreneurs, and prior *work experience in young and small firms* as hypothesized above. To control for life-cycle effects we include *age* of the entrepreneurs as an explanatory variable (Wagner 2006).

Variety in early interests of the participating lead entrepreneurs is based on their inventive behavior in out-of-school activities at the age of 14 or 15. Note that leisure activities are frequently used to rate adolescents' performance (e.g. Holland & Nichols 1964; Hong et al. 1993; Schmitt-Rodermund 2007), since they are intrinsically motivated activities requiring intellectual abilities, task commitment and persistence (Bloom 1985; Hong et al. 1993). Within the Thuringian Founder Study the research team developed 14 items (based on items of Schmitt-Rodermund (2004)) to assess inventive behavior in various areas such as construction, music, games, writing, magic, handiwork, etc. Using the mnemonic technique (memory anchors) described above, the participants were asked to rate the level of their inventive behavior (1=never vs. 5=very often). Following Schmitt-Rodermund and Vondracek (1999) we compute *variety in early interests* as a composite score by counting the number of items in which the nascent entrepreneur in adolescence engaged often and very often (values 4 and 5).

The Big Five personality traits *openness to experience*, *extraversion* and *agreeableness* are assessed using a well-validated German questionnaire (Ostendorf 1990). Note that we assess the personality traits at the date of the interview. However, longitudinal studies found broad personality traits to be remarkably stable over long time periods (for a review see Caspi, Roberts & Shiner 2005), making them a valid predictor of vocational behavior. We also control for the remaining two Big Five personality traits *conscientiousness* and *neuroticism*, which are assessed by the questionnaire as described above. Cronbach alpha coefficients exceeding .6 in for all of these traits indicate internal consistency of the scales.

Research has shown that men are more overconfident than women (e.g. Barber & Odean 2001). This might lead men to report having more varied functional experience than women. To control for this potential bias we include *gender* (binary variable: 1=male, 0=female) as a variable.

RESULTS

Descriptive Results

Table 1 presents descriptive statistics and correlations for all variables used in the statistical analyses. The nascent projects in the sample conducted on average 15 out of a possible 32 gestation activities before the first interview. This number suggests that we seem to “catch” many of the projects in the middle of the venture creation process. As the research team utilized different sources to get in contact with the nascent entrepreneurs, one concern about the sample is its heterogeneity. Employing the Kruskal-Wallis equality-of-populations rank test, we indeed find statistically significant differences concerning the number of activities initiated ($\chi^2 = 33.5$, $p < .01$). In order to account for these differences in the regressions, we use *time invested* and *time since initiation* as control variables.

Regarding the major variable of interest – *variety of functional background* as indicator of the balanced skill set – the entrepreneurs have on average experience in 3.3 functional areas (sd = 1.6). Statistical tests reveal that these differences are not an artifact of the utilization of the different sources in the construction of the dataset.

Regression Analysis and Results

In order to test the hypotheses, we employ the following empirical approach. Considering the nature of the dependent variable *progress* of the project (count variable, no statistical evidence for the presence of overdispersion, absence of zeros in the data²), we use a zero-truncated Poisson model for regression analysis below. Given the nature of the variable *variety of functional background* (count variable, presence of underdispersion), we use a generalized event count model with adjusted standard errors for data analysis.

The first part of the analysis concerns the effect of balanced skills as indicated by the *variety of the functional background* of the nascent entrepreneur on the *progress* of nascent projects (Model 1–2 in Table 2). Model 1 includes all explanatory variables with the exception of *variety of functional background* of the interviewed entrepreneur. In this model none of the human capital variables, e.g. *entrepreneurial experience* turn out to be statistically significant. Model 2 adds the core independent variable to the regression. In support of Hypothesis 1, we find *variety of the functional background* to be positively associated ($p < .01$) with the progress of the project. According to marginal effects the balanced skill set of an entrepreneur is one of the strongest predictors of making *progress* in the venture creation process.

After finding support for the notion that balanced skills are related to the success of nascent projects, we turn to the origins of balanced skills (Model 1–4 in Table 3). Concerning the impact of work and schooling experience (investment hypothesis) on the *variety of the functional background*, we find several significant estimates. According to the results of Model 1, *entrepreneurial experience* ($p < .05$) and *managerial experience* ($p < .05$) predict nascent entrepreneurs' variety of functional background. This supports the respective Hypotheses H2a and H2b. Recall that this regression is based on data of the solo entrepreneur or the lead entrepreneur of a new venture team. In case of team start-ups, by definition, more than one entrepreneur is involved in venture creation. Adding these additional observations³ and exploiting this extended data set in Model 2 strengthens the previous results. However, in addition *work experience in young and small firms* ($p < .01$), and more *variety in university curricula* ($p < .05$) also relate to the nascent entrepreneurs' variety of functional background. Because the coefficients of these two variables were not significant in Model 1, we conclude the respective Hypotheses H2c and H2d to be only partially supported.

Turning to the variables associated with the endowment hypothesis, as expected (Model 3) *variety in early interests* ($p < .05$) successfully predicts nascent entrepreneurs' *variety of functional background*. Among the personality traits only *agreeableness* had a significant ($p < .1$) impact on the functional background variety of nascent entrepreneurs. Contrary to expectations, the regression coefficients for *openness to experience* fail to achieve statistical significance. Among the control variables only *gender* ($p < .1$), but not *conscientiousness*, and *neuroticism* show significant effects.⁴

As a final step, all variables were entered into the analysis to explore the origins of balanced skills (Model 4). Again, *entrepreneurial experience* ($p < .1$) and *managerial experience* ($p < .05$) are positively associated with nascent entrepreneurs' *variety of functional background*. In regards of the impact of personality traits, *agreeableness* ($p < .05$) continued to have a significant impact on variety of functional background. Thus, we conclude H3c – stating lower levels in agreeableness are associated with a balanced skill set – to be supported. However, the expectations concerning openness to experience (H3a) and extraversion (H3b) were not supported. The coefficient of *variety in early interests* turns insignificant in Model 4 when including the variables on subsequent vocational choice. However, given the significant impact of the variable in the reduced Model 1, we conclude the respective Hypothesis H4 – stating higher *variety in early interests* at the time of adolescence is associated with a balanced skill set – to be partially supported.

DISCUSSION

The objective of this paper is to examine the effects and origins of balanced skills among nascent entrepreneurs. Regarding the first research question, we extended a recently proposed economic theory (Lazear 2005) to model performance effects of balanced skills. Concerning the second topic, we combined recent advancements in the fields of entrepreneurship and developmental psychology research to present a more holistic view of the origins of balanced skills among nascent entrepreneurs. In doing so, this paper contributes above all to human capital theory.

Consistent with the predictions of the theoretical model, balanced skills of the nascent entrepreneur are positively related to the progress of high-potential nascent projects in the venture creation process. This aligns with the original work from Lazear and other scholars who reported associations between a balanced skill set and the likelihood of becoming an entrepreneur (e.g. Lazear 2004; Wagner 2003; Silva 2007). It is also consistent with work from Oberschachtsiek who shows balanced skills to positively predict self-employment duration. Taking these findings into consideration, balanced skills appear to be an important success factor throughout the entrepreneurial process.

Moreover, given the results of the present study balanced skills seem to outperform traditional human capital indicators such as *managerial experience* and *entrepreneurial experience* whose explanatory power in nascent entrepreneurship research has been recently questioned (Davidsson & Gordon 2009). Accordingly, no effects of these two factors on project success were found in the present study. The limited performance of these variables can be explained by the investment hypothesis tested above. *Managerial experience* and *entrepreneurial experience* are human capital investments, whereas balanced skills are more an *outcome* of human capital investment. Consequently, balanced skills might be seen as a more direct and proximal indicator of human capital (Unger et al., 2009).

Finally, we examined factors associated with the endowment hypothesis to explain unintentional accumulation of balanced skills. As expected, we found evidence that the *variety in early interests* during nascent entrepreneurs' adolescent years is related to a balanced skill set prior to initiating the nascent venture project. Among the Big Five personality traits, only lower levels of *agreeableness*, and not *openness* and *extraversion*, were significantly correlated with balanced skills. This result is in line with findings in developmental research showing that early competences and personality traits have no direct, but rather indirect effects on economic relevant outcomes such as entrepreneurial intentions (Obschonka et al. 2010) and venture survival (Schmitt-Rodermund 2004).

Comparing the predictive ability of the investment hypothesis and the endowment hypothesis, the latter seems to outperform the former. In particular, the regression investigating the endowment hypothesis (Model 3 compared to Model 1 in Table 3) fit the data slightly better, as indicated by a higher value for Schwarz's (1978) Bayesian information criteria (BIC). The highest goodness of fit, however, is observed for the combined Model 4. Although the dataset used in this study does not contain the same level of very detailed information on the timing of skill accumulation as Silva's (2007) study on Italian employees, the results of the present study raise doubts on the generalizability of Silva's conclusion that a balanced skill set is purely attributable to an innate ability. On the contrary and as Lazear (2005) originally suggested, conscious human capital investment into a balanced skill set by work and schooling experience fostering the acquisition of various experience seems to play an important role. Above and beyond this basic comparison, the findings give rise to the conjecture that the investment and endowment view are substantially intertwined and hard to disentangle. For example, as balanced skills are linked with psychological characteristics, the same might be true for the variables associated with the investment hypothesis such as *variety in university curricula*, *managerial experience*, and *working in small and young firms*. Although, a thorough investigation of these relationships was beyond the scope of the present paper a brief look in the correlation matrix (Table 1) reveals that higher levels of *variety in early interests* is correlated with *managerial experience*.

CONCLUSION

This study contributes to the entrepreneurship literature and human capital theory by proposing a formal model of how balanced skills affect entrepreneurial earnings. Supporting the respective hypothesis we find that a balanced skill set of a nascent entrepreneur is an important predictor of the progress in the venture creation process. Regarding the controversially discussed question whether balanced skills can be consciously acquired by nascent entrepreneurs or reflect an innate ability or specific individual characteristics, the present study finds support for both views.

NOTES

- ¹ A first approach to model income implications among entrepreneurs stems from Åstebro & Thompson (2007). However, they deviate from the original Lazear model by using the restrictive assumption that both skills are uniformly distributed. The present extension is, thus, as general as Lazear's original model.
- ² Progress in the project is recorded at a minimum of at least one activity initiated or completed in the venture creation process.
- ³ The respective information was provided by the interviewed leading entrepreneur of the team.
- ⁴ We do not control for age in Model III, because age reflects all kinds of occupational experience and is thus correlated with variables used in the investment hypothesis (e.g. managerial experience, and entrepreneurial experience). In Model III we intend to solely focus on variables associated with the endowment hypothesis.

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Table 1: Descriptive statistics and correlations

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
(1)Progress	-																				
(2)Variety of functional background	.32	-																			
(3)Entrepreneurial experience	.14	.31	-																		
(4)Managerial experience	.17	.38	-.04	-																	
(5)Work experience in young and small	.16	.15	.17	-.12	-																
(6)Variety in university curricula	-.02	.05	-.10	.08	-.11	-															
(7)Team size	.30	.02	.07	-.03	.11	.12	-														
(8)Knowing entrepreneurs	.11	.19	.16	.10	.16	-.13	-.01	-													
(9)Public advice	.14	.17	-.22	-.09	-.02	.10	.01	-.13	-												
(10)Time invested	.55	.03	.17	.19	.00	.00	.16	.15	.04	-											
(11)Time since initiation	.35	.20	.46	.05	.18	-.19	.10	.06	-.07	.27	-										
(12)Financial capital invested	.60	.31	.13	.16	.19	.06	.20	.10	-.03	.30	.30	-									
(13)Service project	-.04	.12	-.01	-.09	-.10	-.03	.12	-.11	-.04	-.07	.14	.07	-								
(14)Age	.07	.42	.40	.55	-.06	-.12	-.14	.04	-.23	.14	.38	.16	.10	-							
(15)Gender	.06	.15	.07	.08	.09	.09	.12	.08	-.05	.05	.09	.21	-.04	.12	-						
(16)Openness	.07	-.01	.06	-.08	.02	.13	.25	.05	-.06	.07	-.10	-.10	-.14	-.21	-.20	-					
(17)Extraversion	.20	.14	.09	.19	.13	.11	.15	.08	-.06	.20	.09	.13	.04	.10	-.01	.37	-				
(18)Agreeableness	.06	-.11	.05	.11	-.15	-.06	-.02	-.06	.05	.12	.11	-.00	.09	.30	.19	.10	.11	-			
(19)Conscientiousness	-.11	.15	.04	.15	-.07	.01	-.20	.00	-.10	.08	.09	-.07	-.09	.13	-.11	.04	.27	.00	-		
(20)Neuroticism	-.20	-.11	-.10	-.25	.03	-.19	-.15	-.03	.03	-.14	-.13	-.12	-.05	-.19	-.11	-.20	-.46	-.23	-.43	-	
(21)Variety in early interests	.13	.22	.18	.25	.04	.18	.04	.05	.08	.17	.20	.11	-.08	.35	.15	.10	.29	.19	.00	-.23	-
Mean	15.14	3.22	3.24	2.55	.40	1.15	2.42	.89	1.42	12.37	7.33	9.10	0.32	36.45	.89	3.49	3.18	3.16	3.48	1.42	3.82
SD	5.55	1.62	5.84	5.86	.49	.58	1.27	.32	1.57	16.43	28.38	3.74	0.47	9.96	.32	.50	.65	.49	.65	.54	2.14

Note: Correlation coefficients displayed in bold are significant at the 5% level.

Table 2: Performance effects of balanced skills

	Dependent variable: Progress in the venture creation process ^a			
	Model I		Model II	
	β	mf _x	β	mf _x
<i>Balanced skill set</i>				
Variety of functional background	----	----	0.077 *** (3.77)	1.123
<i>Individual level controls</i>				
Entrepreneurial experience	-0.003 (-0.06)	-0.005	-0.006 (-1.01)	-0.084
Managerial experience	0.006 (1.36)	0.092	-0.003 (-0.56)	-0.043
Work experience in young and small firms	0.051 (0.82)	0.754	0.009 (0.14)	0.133
Variety in university curricula	-0.012 (-0.24)	-0.179	-0.018 (-0.35)	-0.257
Knowing entrepreneurs	0.010 (0.09)	0.141	-0.022 (-0.20)	-0.316
Public advice	0.049 ** (2.47)	0.713	0.052 *** (2.63)	0.763
<i>Project level controls</i>				
Team size	0.070 ** (2.98)	1.023	0.077 *** (3.27)	1.120
Time invested	0.007 *** (3.57)	0.095	0.008 *** (4.08)	0.111
Time since initiation	0.002 (1.53)	0.028	0.002 (1.57)	0.029
Financial capital invested	0.000 ** (2.47)	0.001	0.000 ** (2.07)	0.001
Service project	-0.094 (-1.27)	-1.356	-0.111 (-1.49)	-1.158
Industry dummies	Yes *		Yes *	
Intercept	2.289 *** (13.67)		2.084 *** (11.78)	
LR χ^2	96.01 ***		109.66 ***	
Pseudo R ²	0.153		0.175	
AIC	571.46		559.81	
N	95		95	

^a Zero-truncated Poisson regression; β =regression coefficients, z-values in parentheses; mfx=marginal effects; *** (**, *) denote a significance level of 1% (5%, 10%)

Table 3: Origins of balanced skills

	Dependent variable: Variety of functional background ^a							
	Model I		Model II ^b		Model III		Model IV	
	β	mfx	β	mfx	β	mfx	β	mfx
<i>Investment hypothesis</i>								
Entrepreneurial experience	0.016** (1.97)	0.052	0.156** (2.52)	0.043	----	----	0.014* (1.69)	0.045
Managerial experience	0.021** (2.48)	0.067	0.022*** (3.18)	0.060	----	----	0.023** (2.51)	0.071
Work experience in young and small	0.152 (1.60)	0.493	0.269*** (4.03)	0.774	----	----	0.157 (1.53)	0.500
Variety in university curricula	-0.031 (-0.39)	-0.100	0.101** (2.21)	0.228	----	----	-0.028 (-0.34)	-0.088
<i>Endowment hypothesis</i>								
Openness	----	----	----	----	-0.025 (-0.24)	-0.082	-0.082 (-0.86)	-0.259
Extraversion	----	----	----	----	0.035 (0.37)	0.114	0.152 (1.32)	0.476
Agreeableness	----	----	----	----	-0.177* (-1.75)	-0.570	-0.260** (-2.47)	-0.816
Variety in early interests	----	----	----	----	0.052** (2.13)	0.168	0.029 (1.10)	0.090
<i>Controls</i>								
Age	0.006 (0.91)	0.019	0.015*** (3.06)	0.040	----	----	0.006 (0.79)	0.019
Gender	0.175 (1.09)	0.523	0.075 (0.73)	0.202	0.294* (1.66)	0.852	0.300* (1.74)	0.840
Conscientiousness	----	----	----	----	0.113 (1.30)	0.364	0.108 (1.34)	0.340
Neuroticism	----	----	----	----	-0.048 (-0.41)	-0.156	0.028 (0.25)	0.088
Intercept	0.655**		0.140		0.925		0.600	
Deviance	57.90		148.04		66.59		53.48	
Pearson	55.70		142.71		62.62		50.56	
BIC	-342.7		-1051		-329.6		-319.9	
N	95		228		95		95	

^a Generalized event count model; β =regression coefficients, z-values in parentheses; mfx=marginal effects; *** (**, *) denote a significance level of 1% (5%, 10%)

^b Some of the nascent projects are team started. Thus, Model III uses an extended data set including not only the interviewed leading nascent entrepreneur of a project, but also all other nascent entrepreneurs.