

The distribution of Schumpeterian and Kirznerian opportunities

Jeroen P. J. de Jong · Orietta Marsili

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Abstract Despite their presence in modern entrepreneurship theories, empirical investigations of opportunity types are scarce. We develop a 5-dimensional bipolar scale to measure the extent in which opportunities are Schumpeterian or Kirznerian. Drawing on this measure, we examine the shape of the opportunity distribution in relation to the environment and the characteristics of individuals who exploit them. Across a sample of 181 new products introduced by high-tech entrepreneurs, we find that pure Schumpeterian and Kirznerian types are rare, but rather opportunities display varying degrees of membership to one or the other type. The distribution is more skewed toward Schumpeterian opportunities for larger ventures, with a strategic focus on future needs, and operating in growing markets. In contrast, Kirznerian opportunities are more frequently pursued by small ventures, and by entrepreneurs that are young, with a strategic focus on present needs, and who are less innovative in their behavior.

Keywords Austrian economics · Schumpeterian innovation · Opportunity exploitation · Quantile regression

JEL Classifications B52 · B53 · L26 · M13 · O31

1 Introduction

The concept of opportunity is widely recognized as central in entrepreneurship (Alvarez and Barney 2007; Shane and Venkataraman 2000). Yet, most of the contributions on entrepreneurial opportunities are of theoretical nature, addressing the question of what opportunities are and how they emerge (e.g., McMullen et al. 2007). The best-known characterization of opportunities is rooted in Schumpeter's (1934, 1942) and Kirzner's (1973) views about the role of the entrepreneur in the process of market competition, as the individual who actively searches for opportunities or alertly discovers them. Recent studies suggest that the Kirznerian and Schumpeterian categorization of opportunity can help to understand differences in the entrepreneurial process. For example, Samuelsson and Davidsson (2009) observed in a sample of Swedish citizens that the number of gestation activities in venture creation differs between innovative and imitative venture ideas, a distinction that (partly) overlaps with the Schumpeterian–Kirznerian classification. Likewise, Craig and Johnson (2006) tried to identify differences in opportunity recognition of the Schumpeterian type (through innovation) and the Kirznerian type (through alertness) in a sample of

J. P. J. de Jong (✉)
RSM Erasmus University, Burgemeester Oudlaan 50,
3062 PA Rotterdam, The Netherlands
e-mail: jjong@rsm.nl

O. Marsili
School of Management, University of Bath, Bath, UK

students as potential entrepreneurs. However, little is known about the way opportunities are distributed across a broader sample of entrepreneurs, and the factors that are associated with a certain shape of the distribution, specifically with a greater or lesser concentration of cases at the opposite tails of Schumpeterian or Kirznerian types.

In this paper, we develop a measure to empirically map the Schumpeterian versus Kirznerian typology of entrepreneurial opportunities. While previous studies captured specific aspects distinguishing both types (radical vs. incremental innovation, innovation vs. alertness), we here employ a more comprehensive definition of both opportunity types, drawing on the five bipolar dimensions proposed by Shane (2003). Each dimension is measured at the level of single opportunities that were exploited in the form of introduction of new products in the market. Specifically, individual entrepreneurs were asked to indicate one specific new product that they had recently brought to market and to assess it according to Shane's framework. Moreover, as the dimensions have common theoretical ties, and are manifestations of a latent, higher-order construct, they should be highly related (Law et al. 1998). On the basis of the developed scale, we then explore individual and contextual factors associated with the Schumpeterian versus Kirznerian types.

Opportunities can be observed as outcomes of a process that starts with an idea and a perception of potential value, developing over time as the initial idea is brought into actual realization (Ardichvili et al. 2003). This process of opportunity development is closely connected to the traits of the individuals who perceive the opportunity, as some people have greater 'sensitivity' to opportunities than others (Ardichvili et al. 2003), to the entrepreneurs' behavior as they bring together heterogeneous resources to put the opportunity into operation, and to the fit between the emerging opportunity and the market environment (Aldrich and Martinez 2001). As Schumpeter recognized in his later work, new combinations are not only in the minds of enterprising individuals, but they emerge from social and economic relationships, and are retained in the market only if competition allows it (Becker et al. 2011). The nature of opportunities, as outcome of the process of development of an initially perceived opportunity, thus varies with individual-level capabilities and behaviors of the entrepreneur

(Gartner et al. 2003), as well as with contextual conditions (Alvarez and Barney 2010). In this paper, we bring together these two perspectives into one framework that relates the nature of opportunities to the characteristics of the individuals pursuing them, and in the context of the environment in which opportunities are developed. The focus in our study is on one particular form of opportunity, leading to the introduction of a new product into the market. Accordingly, what we capture is an opportunity at the end stage of the opportunity development process. In the analysis, for specific new-product opportunities, realized by a sample of high-tech Dutch small firms, we relate the characteristics that qualify them as Kirznerian or Schumpeterian to a number of attributes of the entrepreneurs (risk propensity, strategic focus, innovative behavior, education and age) and the environment (demand growth and technological dynamism).

This paper adds to the measurement and understanding of the variety of opportunities that entrepreneurs pursue under different circumstances. By taking into account opportunity types, entrepreneurs and contextual conditions, our study contributes to an expanding literature addressing the individual-opportunity nexus (Buenstorf 2007; Dimov 2010a; Dutta and Crossan 2005; Eckhardt and Shane 2003). In particular, the study focuses on the distributional properties of the nexus, by observing the associations between the shape of the opportunity distribution as realized in the market (on a Schumpeterian–Kirznerian scale), the characteristics of entrepreneurs that pursued them, and the environments in which opportunities were developed. As associations, we do not provide causal explanations of the emergence of the opportunity distribution. At the end of the paper, we provide some elaboration on the interdependence mechanisms that are inherent to the opportunity-individual nexus.

2 The distribution of opportunities

Scholars have long elaborated on the differences and similarities that could be identified between Schumpeter and Kirzner's views of the entrepreneur role in the economy. Early scholars regarded the two approaches as antithetic implying that entrepreneurial opportunities are Schumpeterian or Kirznerian. More

recently, the opportunity-based theory of entrepreneurship (Fu-Lai Yu 2001; Holcombe 1998; Shane and Venkataraman 2000) regards the Schumpeterian and Kirznerian perspectives not as exclusive, but rather as alternative representations of different types of opportunities that may coexist in an economy at the same time. In other words, they provide a typology of opportunities, which Venkataraman (1997) identifies as a strong and a weak form of entrepreneurship. Under this assumption, one would expect to empirically observe a highly dispersed distribution with heavy tails corresponding with ‘genuine’ Schumpeterian and Kirznerian opportunities.

A different approach to the characterization of entrepreneurial opportunities emerges from Kirzner’s (1999) later writings. In the 1999 article where he attempts to reconcile his view with Schumpeter’s, and clarify the differences, Kirzner emphasizes that, to understand how market forces work and stimulate entrepreneurial action, his ‘view of entrepreneur as alert to opportunities is valid and important’ (p. 16) even for an innovation that appears as radical as the invention of the automobile and the destruction of the horse-drawn carriage industry. He concludes that ‘... my own view of entrepreneurial activities permits and requires us to see a quite different picture even in that very same sequence of Schumpeterian events’ (p. 17). Following this line of reasoning, a category of genuine Schumpeterian opportunities cannot be disentangled from a category of genuine Kirznerian opportunities, because traits of one or the other can be simultaneously present. As Koppl and Minniti (2010, p. 224) point out ‘Schumpeterian entrepreneurs are accounted for in Kirzner’s theory of entrepreneurship and are, in fact, a subset of the more comprehensive group of Kirznerian entrepreneurs.’ This interpretation of the nature of opportunities departs from the idea of opposite and exclusive categories, but rather regards the opportunity distribution as a continuum. Given opportunities can then to a certain degree be Schumpeterian, and to a certain degree Kirznerian. Therefore, the distribution of opportunities on a Schumpeterian–Kirznerian scale would be concentrated around the mean. Following the consideration that alternative perspectives on the nature of opportunities would predict different shapes of the opportunity distribution among entrepreneurs, we explore the properties of this distribution, by first

showing that opportunity characteristics can be effectively mapped into a Schumpeterian–Kirznerian scale.

3 The nature of opportunities

Shane (2003) summarizes the elements that distinguish Schumpeter and Kirzner’s views into five dimensions of a typology: (1) disequilibrating/equilibrating; (2) requires new information/does not require new information; (3) very innovative/less innovative; (4) rare/common and (5) involves creation/limited to discovery. We apply these dimensions to characterize the nature of opportunities in the context of high-technology environments, where innovation is common. This however does not limit the applicability of the framework. As Kirzner highlights in his 1999 paper, in response to the erroneous interpretation of his work in relation to Schumpeter’s, it is not innovation per se that distinguishes his notion from Schumpeter’s, but the consideration of new opportunities emerging out of forces that are internal to the functioning of the market process, rather than being externally driven by Schumpeterian heroic action (Kirzner 1999). The difference is in the ‘coordinative quality of innovation’ (in the sense that through innovation misallocated resources find more efficient use) as compared to the disruptive quality of Schumpeterian innovations, ‘destroying the pre-existing state of equilibrium’ (Kirzner 1999, p. 5 and p. 14). This is the first dimension in Shane’s typology.

The second dimension of Shane’s framework distinguishes between opportunities that require the production of new information (Schumpeter) thorough technological and scientific advances, and those that only require differential access to information (Kirzner), i.e., which already exists but is available, or perceived to be valuable, to different individuals who happen to be in specific circumstances at certain times. Although innovation is present in both perspectives, its role and significance differ, setting apart, in the third dimension, Schumpeterian opportunities that emerge out of radical innovations and Kirznerian opportunities that are associated with incremental innovations (Shane 2003). In addition, Schumpeterian opportunities with their disruptive nature and potential for breakthrough innovations are of greater value but also more rarely found compared to incremental

innovations (Tushman et al. 1997), which are often the domain of entrepreneurs that imitate or simply replicate established ways of doing things (Aldrich 1999). Accordingly, a fourth dimension distinguishes between rare (Schumpeterian) and common (Kirznerian) opportunities. The last aspect concerns the process of opportunity identification. In all cases, Kirzner (1999) argues, even when opportunities involve change and innovation, it is the market price mechanism that discloses to individuals their existence and value. The role of the entrepreneur is simply that of alertly noticing earlier errors. In contrast, breakthrough innovations are rarely initiated in response to relative price variations (Dosi 1988), but require creative action. The fifth dimension thus contrasts Schumpeterian opportunities that involve creation and Kirznerian opportunities that are limited to discovery.

4 Variety and bounds in the opportunity set

As opportunities differ, the question arises how much variance can be observed among entrepreneurs and which factors are associated with a distribution of opportunities that is concentrated around certain modal types. One possible interpretation is that variance is the outcome of serendipity. Opportunities are randomly distributed and ‘accidental entrepreneurs’ simply stumble upon one or another (Aldrich and Kenworthy 1999). In contrast, the variance of the opportunity set, and where individual entrepreneurs are positioned in the opportunity distribution, can be systematically related to individual and contextual factors. Because people differ in their capabilities, attitudes and experience, they will perceive and value opportunities differently and will act differently upon them. At the same time, what individuals are potentially able to do is limited by the resources they can draw upon and is subject to selection forces in the environment where they operate (Aldrich and Martinez 2001). Thus, the variety observed in the opportunity set is linked to the variety of perception, motivation, and behavior among individuals, as well as to the nature of the environment in which opportunities are formed. In line with this interpretation, we examine the shape (and variance) of the distribution of opportunities in relation to characteristics of the entrepreneur and his/her broader environment.

4.1 Entrepreneur

We investigated how individual characteristics are related with engagement in Schumpeterian or Kirznerian opportunities with respect to five variables: (1) innovative behavior, (2) strategic focus on future needs vis-à-vis current needs, (3) risk-taking propensity, (4) education, and (5) age of the entrepreneur.

Schumpeter’s conception of the entrepreneurial process centers on the personality traits of the individuals who take personal initiative (Kirzner 1999). Entrepreneurs represent only a small proportion of the population, and they distinguish themselves for unique qualities. ‘First of all, there is the dream and the will to found a private kingdom, usually, though not necessarily, also a dynasty.... Then there is the will to conquer: the impulse to fight, to prove oneself superior to others, to succeed for the sake, not for the fruits of success, but of success itself.... Finally, there is the joy of creating, of getting things done, or simply of exercising one’s energy and ingenuity.’ (Schumpeter 1934: p. 93). Schumpeter’s portrait of the entrepreneur is of a leader, who with boldness and ambition challenges conventional wisdom to overcome social resistance and skepticism, and an innovative person, who combines creativity and a proactive attitude.

In contrast, in Kirzner’s (1997) view individuals do not need to possess special qualities or be proactive, but they simply need to be in a state of general alertness. In fact, ‘an opportunity for pure profit cannot, by its nature be the object of systematic search’ (p. 71) because there is always an element of surprise in ‘the realization that one had overlooked something in fact readily available’ (p. 72). In a recent contribution, Kirzner (2009) recognizes that real-world entrepreneurs are often innovators, departing from the hypothetical assumption of a ‘purely alert’ entrepreneur. Nevertheless, even when formulating expectations about the future because of uncertainty and continuous change, a Kirznerian entrepreneur considers opportunities as readily available, ‘waiting to be grasped’ at this moment, as if they ‘exist’ now (p. 150). This speculative element in the way entrepreneurs perceive opportunities is key to set apart Kirzner’s view from Schumpeter. In Schumpeter the innovative entrepreneur springs to action because she foresees the application of new discoveries; in Kirzner, the innovative entrepreneur sees opportunities in

the same way that a purely alert entrepreneur perceives an opportunity to buy and sell at different prices, and, by way of innovation, she is able to find a more efficient use of misallocated resources or to meet presently unfulfilled demands.

Overall, Schumpeter and Kirzner's accounts of what they view as the role of the entrepreneur, suggest that individual qualities such as innovative behavior (i.e., creativity and search), and orientation toward future needs vis-à-vis current needs, are more likely to be observed in entrepreneurs that pursue opportunities of the Schumpeterian type, and less likely for opportunities of Kirznerian type. Accordingly, we selected these individual-level variables for empirical investigation, i.e., if they discriminate opportunities of different type.

Although Schumpeter does not see the entrepreneur as the individual who bears risk, scholars have associated Schumpeterian opportunities, because of the novelty of innovations that break way from existing routines, with a greater propensity of entrepreneurs to take risk, compared to Kirznerian opportunities that build incrementally upon or replicate existing business or product concepts (Shane 2003). For this reason, we added risk-taking propensity to the variables for our empirical analysis.

We also added education, as Samuelsson and Davidsson (2009) found that general knowledge, from formal education, helps entrepreneurs to progress with the activities involved in the setting up of a new venture, more so when this is based on an innovative idea than on imitation. Formal education equips the entrepreneur with a broad set of knowledge and skills that are important to master innovative ideas, which are more complex and uncertain than imitative ideas; formal education also signals to stakeholders the value of an enterprise when this involves innovative ideas that are ambiguous and difficult to communicate, and finally, because of opportunity costs, the greater rewards expected from more innovative ideas enhances the motivation to set up a business for highly educated individuals (Samuelsson and Davidsson 2009). Since the distinction between innovative and imitative ideas bears common elements with Shane's typology, we expect that the entrepreneur's level of education increases the probability of an opportunity to be of Schumpeterian type, and decreases that of Kirznerian type.

Finally, we considered the entrepreneur's age. Although its theoretical relationship with engagement

in any of the opportunity types is not a priori clear in advance, we added the entrepreneur's age to our analysis to explore if and how it is related. First, age indicates experience, capturing general human capital and on-the-job training, and may influence a venture's early success (Preisendörfer and Voss 1990; Stuart and Abetti 1990). As more experienced entrepreneurs can draw on a richer pool of resources and established relationships, they may pursue more challenging and complex opportunities, of the Schumpeterian type. Alternatively, aging increases the opportunity costs of starting a new venture, so older individuals may invest less time in starting a new venture and more time in waged work as compared to younger individuals (Lévesque and Minniti 2006). As aging diminishes the time frame for the returns to entrepreneurship, older entrepreneurs may allocate less time to the development of a Schumpeterian opportunity, which bear high but uncertain returns in the future.

4.2 Environment

We investigated how the external environment is related with engagement in Schumpeterian or Kirznerian opportunities with respect to (a) demand growth and (b) technological dynamism.

The distribution of opportunities can differ according to demand growth. With an expanding market, it should be easier, or less expensive, for entrepreneurs to acquire resources, even when they are controlled by established firms. In addition, it is more likely that scale economies in the exploitation of opportunities can be achieved (Davidsson et al. 1994) or that the pursuit of more important or uncertain opportunities is encouraged by the fact that many people are in demand of a good or service (Shane 2003). Vice versa, exploiting Schumpeterian opportunities may, by their disequilibrating nature, induce demand growth. In sum, we expect Schumpeterian opportunities to be associated with demand growth.

As well, rapid technology change is likely to be associated with a dominance of Schumpeterian cases in the opportunity distribution. Technological advances create a new knowledge basis upon which innovative entrepreneurs draw ideas and solutions in the pursuit of Schumpeterian opportunities (Nelson and Winter 1982), while new knowledge is not necessary for Kirznerian opportunities (Shane 2003). Alternatively, while drawing on new knowledge and

being self-created, Schumpeterian opportunities more likely will advance technological change in the environment.

Finally, we control for possible differences in firm size, as large organizations can relay on greater resources to invest in the search for and exploitation of Schumpeterian opportunities (Schumpeter 1942).

5 Data

We collaborated with EIM, a Dutch research institute specializing in entrepreneurship and small businesses. EIM annually surveyed a panel of Dutch high-tech small firms, and we were allowed to add questions to one of these surveys. High-tech small firms were defined as firms with less than 250 employees, actively conducting R&D, and intentionally developing and/or applying new technologies in their products. The panel members were active in industries such as manufacturing of machinery and equipment, chemical and pharmaceutical products, and also in services, including software developers, engineering firms, and commercial R&D firms. The choice of the EIM panel of high-tech startups as basis for our enquiry was motivated by the anticipation that the sample would contain many firms exploiting Schumpeterian opportunities. Schumpeterian opportunities are expected to be rare, and, in a broader sample we would predict to find mostly Kirznerian opportunities.

Our data collection entailed two steps. First, as part of the annual telephone survey that EIM conducted, we were allowed to include screening questions to identify those panel members who had recently engaged in opportunity exploitation. Respondents were all owners or general managers, i.e., the business' main decision makers, and usually the person who had started the venture. We first asked whether they had developed any new product in the past 3 years and launched it to the market. If yes, we asked them to describe the product via an open-ended question. In case respondents had developed multiple products they were asked to report their most recent example, assuming that this provides most accurate recall. A wide variety of products was mentioned, for example an onboard monitor and routing system for sea vessels, a filtering unit to purify drinking water, a geo-phone to explore treasures of the soil, a combined adjustable spanner for plumbers, a new type of herbal

Table 1 Distributions of sampled and responding panel members

	Sample (<i>n</i> = 429)	Respondents (<i>n</i> = 181)
<i>Size class</i>		
1–9 employees	45 %	42 %
10–49 employees	41 %	43 %
>50 employees	14 %	15 %
	100 %	100 %
<i>Industry type</i>		
Manufacturers of chemicals, rubbers, and plastics (NACE codes 23–25)	8 %	9 %
Manufacturers of machinery, electrical devices, transport equipment (29–34)	26 %	27 %
Other manufacturers (NACE 15–22, 26–28; 35–37)	11 %	11 %
Technical wholesale firms (NACE 51.8)	8 %	11 %
IT and telecom services (NACE 64.2; 72)	21 %	19 %
Engineering and commercial R&D services (NACE 74.2; 73)	21 %	18 %
Other services	5 %	5 %
	100 %	100 %
<i>Education</i>		
Bachelor or master degree	84 %	87 %
<i>Age</i>		
In years	45.4	45.6

cheese, and a disinfection device for medical applications. The survey targeted the full panel of 779 members. Of these, 532 were successfully contacted by EIM over a 4-week period. Within this group, 429 panel members matched with our screening criteria: a recent product introduction and willing to participate in the follow-up survey. In comparison with the full panel, these respondents were not biased in composition. Drawing on χ^2 and *t* tests, we found that they did not differ from non-respondents and others that failed to pass the screening. In terms of industry types, firm size classes, and the entrepreneur's education level and age, significance of difference tests gave no significant results ($p > 5\%$) regardless of the distribution that we tested. In terms of age, 25 % of the firms was no more than 6 years old, 50 % was no more than 10 years old, and 75 % was no more than 21 years old.

Table 2 Exploratory factor analysis of opportunity-type items ($n = 181$)

This product...	Dimension				
	I	II	III	IV	V
<i>(Disequilibrating/equilibrating)</i>					
...is very influential— ...has no external impact	.88	-.03	-.11	-.08	-.09
...forces others to change—...only induces internal change	.66	.03	.07	.11	.04
...disturbs market relationships— ...respects market relationships ^a					
<i>(Requires new information/no new information)</i>					
...mainly applies new knowledge—...benefits from established knowledge	.07	.82	-.02	.00	.00
...draws on new information—...uses existing information	-.06	.83	.02	.01	.00
...introduces new concepts—...builds on existing concepts ^a					
<i>(Very innovative/less innovative)</i>					
...is entirely new— ...applies something incumbent	.11	.14	-.12	.05	-.56
...is revolutionary—...is an incremental improvement	-.03	-.03	.03	.04	-.93
...is full of risks—...is on the safe side ^a					
<i>(Rare/common)</i>					
...is unique—...is seen very often	.01	.06	-.03	.86	-.08
...is hard to imitate— ...is easy to copy ^a					
...is rarely seen—...is commonplace	.19	.00	-.09	.48	-.10
<i>(Creation/discovery)</i>					
...is self-created—...is due to being alert on market opportunities	-.05	-.01	-.72	.19	.03
...creates new market opportunities— ...utilizes existing opportunities ^a					

Table 2 continued

This product...	Dimension				
	I	II	III	IV	V
...is primarily our own idea—...has an external source	.08	.05	-.74	-.16	-.11
Cronbach's α (of bold items)	.76	.81	.73	.76	.83

7-point bipolar scale

^a Item dropped in selection process

The second step consisted of a follow-up mail survey that EIM administered as part of its regular data collection. We were allowed to add a dedicated section which was only offered to the 429 respondents that had passed our screening. The introduction to this section explicitly indicated that we were interested in the specific product that respondents had described on the phone. The full description of the product was printed first. The respondents were then asked to rate their product on the basis of a semantic differential scale, which involved the use of bipolar items. We used this scale to document to what extent the (product) opportunity could be characterized as Schumpeterian or Kirznerian. Although the questionnaire was answered by one single respondent per opportunity, the focus on a specific product description, can contribute to mitigate the influence of subjective elements. In the follow-up survey, we received 184 completed questionnaires. After listwise deletion of cases with missing values, 181 respondents remained a 42 percent response rate. Table 1 gives the composition of the sample screened from the panel and the respondents. When we applied χ^2 and t tests, respondents and non-respondents were not different on any background variable ($p > .05$), indicating that response bias was not present.

6 Measuring opportunity types

To develop a higher-order measure of opportunity types, we created fifteen items, all of them inspired on Shane's (2003) typology. For each dimension, three items were formulated. All items were bipolar sentence completers so that respondents could report on

the nature of their product, and completed on a seven-point scale. For example, we asked respondents to mark whether the opportunity was either ‘entirely new’ (Schumpeter) or ‘applying something incumbent’ (Kirzner). The full list of bipolar items is presented in Table 2.

We first conducted a range of exploratory factor analyses (EFA) to find potentially useful factor structures and to remove ambiguous items. An initial EFA produced four factors with eigenvalues exceeding one; the dimensions ‘very innovative/less innovative’ and ‘creation/discovery’ would be merged. However, an alternative EFA that was forced to extract five factors indicated that the proposed five dimensions were present in our data. Both solutions, with four or five factors, contained some ambiguous items (factor loadings $>.30$ on multiple dimensions), and for this reason we engaged in an item-selection process. Following Hair et al. (2007), this was done by removing items one-by-one on the basis of factor loadings. This generated a 10-item scale explaining 83 % of the variance, with two items for each dimension. See Table 2 (four-factor solution available on request). Cronbach’s α ($>.70$) indicated good reliability for each dimension.

Next, we analyzed whether a higher-order factor can be identified which is reflected by the five bipolar dimensions as proposed by Shane (2003). Following Law et al. (1998), we conducted confirmatory factor analyses (CFA) to evaluate model fit. As the strongest test of fit is to compare various models representing different hypothetical relationships (Hair et al. 2007), we estimated three models. Drawing on maximum likelihood estimation, model fit was assessed with absolute, incremental and parsimonious fit measures (threshold values in brackets, based on Hair et al. 2007): GFI ($>.95$), RMSEA ($<.07$), TLI ($>.95$), NFI ($>.95$) and χ^2/df (<2.0).

We first specified a model in which all ten items loaded onto a single factor. Error terms between the items were not allowed to correlate. Model fit was poor (GFI = .80; RMSEA = .180; TLI = .64; NFI = .69; χ^2/df = 6.85) showing that the items were not one-dimensional. We then specified a higher-order model with four first-order factors, i.e., the innovativeness and creation/discovery items were loaded on a single factor, while the other factors were indicated by two items each. Model fit was marginally acceptable (GFI = .94; RMSEA = .086; TLI = .92; NFI =

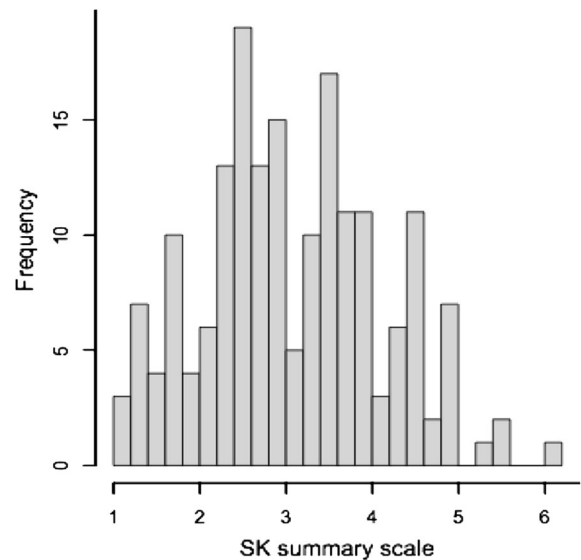


Fig. 1 Distribution of opportunities on the Schumpeterian–Kirznerian scale ($n = 181$)

.91; $\chi^2/df = 2.34$). Finally, we specified a higher-order model with five first-order factors, each indicated by two items. This model had a superior fit (GFI = .96; RMSEA = .060; TLI = .96; NFI = .95; $\chi^2/df = 1.64$) and was clearly better than the four-factor model.

In the five-factor model, all standardized item loadings were exceeding .60 ($p < .001$), while the first-order constructs loaded on the higher-order factor with .67 (disequilibrating/equilibrating), .51 (new information/no new information), .97 (very innovative/less innovative), .71 (rare/common), and .74 (creation/discovery). These results suggest that the five dimensions can be regarded as reflections of a higher-order construct, indicating the extent in which an opportunity is Kirznerian (vs. Schumpeterian). Drawing on the selected ten items, we computed an average Schumpeter–Kirzner (SK) opportunity score, in such a way that high values indicated Kirznerian opportunities and vice versa.

7 Empirical distribution

Figure 1 reports the distribution in our sample according to the overall measure. Most cases are concentrated toward the middle of the scale. The inter-quartile difference shows that 50 % of respondents rank the opportunity on a scale from 2.3 (first quartile)

to 3.8 (third quartile), out of a possible interval from 1 to 7. If the observed scores were generated by a theoretical distribution representing two opposite categories of pure Schumpeterian and Kirznerian opportunities, one would expect to find cases at both ends of the scale, or, possibly, even most of them clustered at the ends with fewer in the middle. Instead respondents are more alike and manifest a general orientation toward entrepreneurial action (as expressed by the central tendency of the distribution), which reflects the ‘pure’ categories of Schumpeterian and Kirznerian opportunities only to a certain degree.

While most opportunities are at the center of the distribution, those at the tails are the closest to the pure Schumpeterian and Kirznerian types. The kurtosis of the SK scale is lower than the value of a normal distribution (excess kurtosis is equal to -0.45). The empirical distribution tends to be platykurtic, it has a lower and wider peak than the normal distribution, and its tails are thinner.

It is worth noting that the definition of pure types is here a relative one. It is contingent on the set of opportunities observed in our sample, and it is well possible that entrepreneurs that engage in pure Schumpeterian opportunities are exceptional cases that have not been included in the sample, and that those engaging in pure Kirznerian opportunities have already been selected out, e.g., in a high-tech industry their venture might not survive long enough to be detected. Nevertheless, if we think of the opportunity set as a continuum, then opportunities positioned near the tails of the distribution are those with the highest level of membership to one or the other type, even if they may not belong to either category to the full extent. Next step in our study is to understand the factors that correlate with such degree of membership, that is, with the position of the single opportunity along the distribution, and especially at the tails of extreme types.

8 Measuring proposed covariates

Recall that our analysis of individual and environmental variables included innovative behavior, strategic focus on future needs or on current needs, risk-taking propensity, education, age, demand growth, and technological dynamism.

At the individual level, innovative behavior was measured with four items ($\alpha = .77$) based on Scott and

Bruce (1994), namely (1) ‘I search out new technologies, techniques or product ideas,’ (2) ‘I generate creative ideas,’ (3) ‘People consider me an innovative person,’ and (4) ‘I investigate and secure funds needed to implement new ideas.’ The items were rated 1 (never) to 5 (always). To discern the strategic focus that individual entrepreneurs hold and impart on their ventures, we could use two indicators. Respondents had been asked to indicate to what extent their strategic focus stressed satisfying future needs, and exploiting current needs. More specifically, they were asked to respond to the statements ‘In my business I strategically emphasize new-product development to satisfy anticipated future needs’ and ‘In my business I strategically emphasize the exploitation of opportunities to better satisfy today’s needs.’ Answers were rated 1 (not at all) to 5 (to a large extent). The correlation coefficient between both items was negative but not significant ($r = -.08$), so that the indicators could not be combined in an overall measure. Accordingly, we analyzed both items as separate variables. Risk-taking propensity was measured by calculating the mean of three items ($\alpha = .81$) based on Gomez-Mejia and Balkin (1989). The items consist of ‘I never mind to engage in risky ventures,’ ‘I am willing to take risks,’ and ‘I like to take a chance.’ The items were rated 1 (totally disagree) to 5 (totally agree). For education, we used a dummy variable indicating whether the respondent had at least a master’s degree. We also included the entrepreneur’s age, as indicative of the general level of experience of individuals. The entrepreneurs’ age distribution is fairly symmetric, with mean equal to 45.6 years and median equal to 45 years of age. The lowest quartile is composed of entrepreneurs that are under 39 years, and the highest quartile of entrepreneurs that are 51 years and over.

As for the environmental variables, we used two multiple-item measures. Respondents rated demand growth on three items ($\alpha = .82$): ‘Our most important market is expanding rapidly,’ ‘In our market we have plenty opportunities to grow,’ and ‘There is in our market a large unexploited market potential.’ Technological dynamism was captured by two items ($\alpha = .75$): ‘In our market products and services tend to become obsolete quickly’ and ‘In our market you need to continuously adopt new technologies to stay tuned.’ All the items for the environmental variables were rated 1 (totally disagree) to 5 (totally agree).

Table 3 Descriptive statistics ($n = 181$)

Variable	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) SK opportunity measure	3.08	1.06									
(2) Risk-taking propensity	3.82	.65	-.05								
(3) Innovative behavior	4.12	.51	-.19**	.23**							
(4) Strategic focus on future needs	4.08	.75	-.36**	-.02	.18**						
(5) Strategic focus on current needs	3.65	1.16	.35**	.02	-.07	-.08					
(6) Education	.48	.50	-.10	.05	-.07	.09	-.06				
(7) Log firm size	2.57	1.28	-.06	.11	-.21**	-.04	-.04	.01			
(8) Age of the entrepreneur	45.6	8.85	-.08	-.12	-.06	-.05	-.02	-.04	-.02		
(9) Demand growth	3.70	.76	-.27**	.24**	.28**	.17**	-.06	.20**	-.18**	-.10	
(10) Technological dynamism	3.32	.87	-.05	.07	.01	.09	-.06	.09	.05	.03	.17**

Significances ** $p < .05$; * $p < .10$

We also added the size of the venture, expressed in number of employees, to control for the stock of resources available to an entrepreneur (Bruderl and Schussler 1990). The average firm size in full-time equivalent was 27.6 employees, with a standard deviation of 41.1. Because the variable was not normally distributed, we log transformed it. In Table 3, offering descriptive statistics, the correlation coefficients do not indicate problems of multicollinearity for the regression analyses.

9 Regression results

To examine how the shape of the opportunity distribution varies in relation to individual and environmental factors, we used quantile regression (Koenker and Bassett 1978). Quantile regression is preferred over traditional OLS regression because it looks at the entire distribution including the extreme values rather than relying on Gaussian statistics (Ebersberger et al. 2010). In a linear regression the mean value of a dependent variable is assumed to vary linearly with the values of the covariates. In a quantile regression relationships are modeled similarly, but the specification of the model may vary for each quantile. Accordingly, it is possible to identify differences in the factors that are associated with the presence of opposite opportunity types, either pure Schumpeterian or pure Kirznerian, at the tails of the distribution, from those that correlated with the central tendency of the distribution (i.e., the mean score of the opportunity

measure). The τ th quantile is estimated as solution to the following minimization problem (Koenker and Bassett 1978; Koenker and Hallock 2001)

$$\min_{\beta} \sum_i \rho_{\tau}(y_i - \xi(x_i, \beta)) \quad (1)$$

where $\rho_{\tau}(u)$ is the tilted absolute value function defined by:

$$\rho_{\tau}(u) = \begin{cases} \tau & \text{if } u \geq 0 \\ \tau - 1 & \text{if } u < 0 \end{cases} \quad (2)$$

and $\xi(x_i, \beta)$ is a linear function of parameters, which we specify as follows:

$$\begin{aligned} \xi(x_i, \beta) = & \beta_0 + \beta_1 \text{RiskTaking} + \beta_2 \text{InnBehaviour} \\ & + \beta_3 \text{FutureNeedsFocus} \\ & + \beta_4 \text{CurrentNeedsFocus} + \beta_5 \text{Edu} + \beta_6 \text{Age} \\ & + \beta_7 \text{FirmSize} + \beta_8 \text{MarketGr} + \beta_9 \text{TechDyn} \end{aligned} \quad (3)$$

Table 4 shows the coefficients of the quantile regression estimated for all the deciles ranging from 10 to 90 percent of our opportunity measure. To assess whether estimating the relationship of the covariates with the quantiles of the distribution adds information with respect to the association with the mean, the OLS estimates are reported on the left. Because the opportunity measure has higher values for predominantly Kirznerian opportunities, and lower values for predominantly Schumpeterian opportunities, a negative coefficient on the lower quantiles indicates a heavier left-hand tail. Accordingly, the variance of the

Table 4 OLS and quantile regressions of opportunity types ($n = 181$)

	Quantiles									
	Mean	10 %	20 %	30 %	40 %	50 %	60 %	70 %	80 %	90 %
Intercept	5.456*** (0.789)	3.089*** (0.870)	3.810*** (0.537)	4.421*** (0.957)	6.031*** (0.910)	6.314*** (1.027)	5.837*** (1.001)	5.949*** (1.103)	6.592*** (1.110)	6.599*** (0.971)
Risk taking	0.008 (0.113)	-0.052 (0.134)	-0.087 (0.096)	0.028 (0.102)	0.066 (0.102)	0.046 (0.126)	0.012 (0.129)	0.104 (0.154)	0.280* (0.166)	0.244* (0.127)
Innovative behavior	-0.178 (0.149)	0.092 (0.164)	-0.156 (0.145)	-0.091 (0.161)	-0.279 (0.174)	-0.215 (0.193)	-0.022 (0.179)	-0.258 (0.223)	-0.624*** (0.231)	-0.639*** (0.174)
Focus on future needs	-0.418*** (0.094)	-0.350*** (0.102)	-0.236*** (0.075)	-0.296** (0.064)	-0.385*** (0.128)	-0.509*** (0.145)	-0.612*** (0.119)	-0.599*** (0.125)	-0.449*** (0.130)	-0.426*** (0.111)
Focus on today's needs	0.270*** (0.060)	0.300*** (0.061)	0.335*** (0.060)	0.275*** (0.064)	0.204*** (0.064)	0.272*** (0.070)	0.330*** (0.070)	0.328*** (0.083)	0.245*** (0.069)	0.298*** (0.074)
Entrepreneur education	-0.047 (0.140)	-0.050 (0.153)	-0.131 (0.133)	-0.114 (0.144)	-0.264* (0.156)	-0.138 (0.176)	-0.026 (0.171)	-0.204 (0.200)	-0.096 (0.234)	0.158 (0.188)
Entrepreneur age	-0.125* (0.069)	0.004 (0.096)	-0.074 (0.072)	-0.102 (0.078)	-0.158** (0.070)	-0.156* (0.081)	-0.186** (0.074)	-0.084 (0.088)	-0.161** (0.081)	-0.253** (0.073)
Firm size	-0.129* (0.072)	-0.212*** (0.079)	-0.153** (0.068)	-0.133* (0.070)	-0.121 (0.077)	-0.146* (0.086)	-0.077 (0.077)	-0.080 (0.105)	-0.205* (0.112)	-0.207** (0.091)
Demand growth	-0.294** (0.101)	-0.327*** (0.122)	-0.256** (0.103)	-0.344*** (0.125)	-0.383*** (0.124)	-0.398*** (0.120)	-0.369*** (0.107)	-0.257** (0.130)	-0.069 (0.104)	-0.133 (0.091)
Technological dynamism	0.049 (0.080)	0.082 (0.104)	0.050 (0.093)	-0.039 (0.097)	0.020 (0.094)	0.018 (0.101)	0.042 (0.107)	0.167 (0.131)	0.041 (0.125)	0.160 (0.078)
R-squared ^a	0.2559	0.2376	0.2191	0.1969	0.1927	0.1968	0.193	0.1769	0.187	0.2163

Standard errors in parentheses. Two-tailed test. * Significant at 10 %; ** at 5 %; *** at 1 %. High values of the dependent variable indicate Kirznerian opportunities (vs. Schumpeterian)

^a Adjusted R-squared for the OLS regression and pseudo R-squared for the quantile regression

distribution increases with the covariate because a larger number of opportunities in the population are closer to the ‘pure’ Schumpeterian type. In contrast, a positive coefficient at the higher quantiles indicates heavier right-hand tail. Hence, the variance of the distribution increases because more opportunities in the population are of the ‘pure’ Kirznerian type.

The regression coefficients reported in Table 4 show that the strategic focus of the entrepreneur most significantly discriminates between the kinds of opportunities pursued, over the entire domain of the opportunity distribution. Specifically, the positive estimated coefficient of the variable ‘strategic focus on current needs’ is fairly invariant across all quantiles. Thus, the Kirznerian nature of opportunities is associated, at basically any point of the distribution, with entrepreneurs ‘strategic focus on exploiting opportunities to meet present demands. This relationship is equally reflected by the mean of the opportunity distribution, since the quantile regression provides similar outcomes as the OLS (conditional mean) regression. For example the coefficient at quantile 10 ($b = 0.300$, $p < .01$) is not much different from the coefficient at quantile 90 ($b = 0.298$, $p < .01$) and the OLS coefficient ($b = 0.270$, $p < .01$).

A different pattern emerges for the strategy focus indicator of being focused on future needs. Here, the coefficient, of negative sign, is still significant across the full distribution (Table 4), but it appears to be higher (in absolute value) for the higher quantiles. For example the coefficient at quantile 80 ($b = -0.449$, $p < .01$) is twice the coefficient at quantile 20 ($b = -0.236$, $p < .01$). This implies that entrepreneur’s strategic focus on future needs is associated with a more skewed distribution toward Schumpeterian opportunities, as the Schumpeterian tail becomes heavier more than proportionally to the tail of Kirznerian opportunities becoming thinner. Hence, entrepreneurs’ perception of opportunities to be in future developments is associated not only with a tendency of opportunities to be more Schumpeterian than Kirznerian, but also with a larger presence of ‘pure’ Schumpeterian opportunities vis-à-vis ‘pure’ Kirznerian ones. In this case, the results of the quantile regression reveal a change in the shape of the opportunity distribution, additional to the shift in central tendency as captured by the OLS regression ($b = -0.418$, $p < .01$).

The distribution of opportunities is also related with the size of the venture. In Table 4, the coefficient of

firm size is negative, marginally significant at the median, and statistically more significant at the tails of the distribution. For larger firms, the conditional distribution displays a greater share of Schumpeterian opportunities, and a smaller share of the Kirznerian opportunities, with approximately comparable variation in the tails heaviness ($b = -0.212$, $p < 0.01$ at 10 % quantile and $b = -0.207$, $p < 0.05$ at 90 % quantile). This finding is consistent with earlier observations that those drawing on larger resources in larger organizations are more likely to pursue opportunities of the Schumpeterian type (Shane 2003).

For other individual-level variables, the coefficient is statistically significant only at one tail of the distribution. Specifically, for the entrepreneurs’ innovative behavior, the coefficient is negative and statistically significant at the top end of the opportunity distribution (quantiles 80 and 90). This implies that the Kirznerian tail of the distribution becomes thinner and the variance will decrease. More creative and proactive entrepreneurs are less likely to pursue highly Kirznerian opportunities, but not more likely to exploit Schumpeterian ones. It is worth noting that the coefficient of the OLS regression is not statistically significant, indicating that while innovative behavior is related to the heaviness of the Kirznerian tail of the distribution, the relationship is not captured by the central tendency (the mean) of the distribution. At the same top quantiles (80 and 90), the coefficient for the entrepreneur’s risk taking is positive and marginally significant. Contrary to what we expected, entrepreneurs with a stronger propensity toward risk tend to pursue opportunities at the top tail of ‘pure’ Kirznerian opportunities, while no statistically significant association is observed with Schumpeterian opportunities.

The entrepreneur’s age also correlates with the position in the opportunity distribution. The coefficient of this variable is negative and statistically significant at quantiles 40 and above, indicating that younger entrepreneurs are more likely to be engaged with Kirznerian opportunities. A closer look at Table 4 shows that the estimated coefficient is close to zero at the Schumpeterian tail (quantiles 10 and 20) and progressively increases at the higher quantiles. This suggests that while there is a strong tendency of young entrepreneurs to concentrate on Kirznerian opportunities, some of them may reach out to the tail of Schumpeterian opportunities together with relatively older entrepreneurs. Finally, the estimated coefficient

for education is marginally statistically significant at quantile 40, indicating a weak association between the entrepreneur's education and opportunity type.

When looking at the environment-level variables, we find that the variance of the opportunity set significantly correlates with demand growth, but not with technological dynamism. This can be due to the fact that entrepreneurs in the sample all operate in high-technology industries, relatively similar in terms of rate of technological change, while differences in demand can be more prominent. Table 4 shows that for demand growth, the estimated coefficient is negative and statistically significant across most of the opportunity distribution, except at the top quantiles (80 and 90). In addition, the OLS regression estimates reveal that the coefficient is statistically significant, and of comparable size, for the mean. Demand growth is thus associated with the pursuit of Schumpeterian opportunities, on average as well as by increasing the proportion of opportunities that are highly Schumpeterian. In contrast, 'pure' Kirznerian opportunities are exploited under varying demand growth conditions.

10 Discussion

This paper examined the nature and distribution of new-product opportunities that were commercially exploited by a sample of high-tech small business owners in the Netherlands. We first developed a multidimensional measure to map the extent in which opportunities, realized in the form of new products introduced in the market, could be considered of Schumpeterian versus Kirznerian nature. The items were formulated to capture five dimensions that, according to the framework proposed by Shane (2003), distinguish between disequilibrating/equilibrating, new information/no new information involved, very innovative/less innovative, rare/common, and creation/discovery. The results of a confirmatory factor analysis showed that indeed a higher-order construct can be identified reflected by these bipolar dimensions. This measure allowed us to illustrate the properties of the opportunity distribution in our sample of entrepreneurs.

First, we find that opportunities are highly heterogeneous, with entrepreneurs from high-tech sectors that position themselves across the full range from Kirznerian to Schumpeterian opportunities. This confirms the proposition from opportunity-based

entrepreneurship scholars that the Schumpeterian and Kirznerian perspectives are not antithetic but rather represent a variety of cases that can simultaneously be present. In Kirzner's (2009) words: '...Apparently, there must be scope for both a creative entrepreneur (...) and a passive, alert entrepreneur (...) It seems reasonable to see the full dynamic of the capitalist system as being the outcome of two distinct kinds of entrepreneur-driven changes' (p. 149).

Second, the observation of a distribution of opportunities concentrated around the mean of our opportunity measure, with relatively thin tails, suggests a more nuanced interpretation of the simple coexistence of the two types of opportunities. There seem to be no empirical boundaries that clearly set apart Schumpeterian and Kirznerian opportunities, but rather the opportunity distribution is a continuum in which most opportunities are in the ambiguous domain in the middle of the distribution. At least in our sample of high-tech firms, we can conclude that both Schumpeterian and Kirznerian opportunities as pure types are rare.

Third, the shape of the opportunity distribution in our sample varies in relation to the characteristics of individual entrepreneurs and the external context. In particular, by applying quantile regression, we could distinguish between the behavior at the tails of 'pure' Kirznerian and Schumpeterian opportunities and the central tendency of the distribution. Strategic focus and firm size are associated with a general shift in the distribution. Specifically, Schumpeterian opportunities are more likely to be pursued by entrepreneurs with a strategic focus on future needs vis-à-vis current needs—consistent with Kirzner's fundamental distinction between opportunities that are seen as existing at the present time (Kirznerian) or in the future (Schumpeterian)—and by larger ventures. Other factors instead are incidental to the pursuit of 'pure' Schumpeterian or 'pure' Kirznerian opportunities. Entrepreneurs that position themselves at the tail of Schumpeterian opportunities generally operate in rapidly growing markets. To the other extreme, entrepreneurs at the tail of Kirznerian opportunities are generally younger and characterized by less innovative behavior (in terms of creativity and proactive search), and some propensity toward risk taking (which was marginally significant at the very Kirznerian side). Interestingly, the lack of a statistically significant association between risk taking and Schumpeterian opportunities suggests that risk-loving entrepreneurs are not necessarily those that

identify and exploit opportunities of highest potential, while risk-adverse individuals may as well become ‘accidental entrepreneurs’ with great potential for their business. This is consistent with the partly random nature of the distribution. Here, we can remark that Schumpeter (1934) himself advocated that risk taking is not an entrepreneurial trait, but rather the capitalist’s function.

Finally, the formal education of the entrepreneur does not help to differentiate the type of opportunity exploited to a significant degree, although the result observed for the entrepreneur’s age would suggest that it is life experience more than formal educational attainment that directs entrepreneurs toward Schumpeterian opportunities as compared to Kirznerian ones.

Overall, our results uncover elements of serendipity as well as structure in the way opportunities are distributed across entrepreneurs. Independent of their risk propensity, entrepreneurs may accidentally step into an idea of great potential, but whether they are able to develop it into Schumpeterian opportunity has to do with their strategic focus, proactive behavior and experience, and whether their environment allows it.

10.1 Limitations, suggestions, and practical implications

There are limitations in our study from which directions for future research directly follow. First and foremost, we only observed new-product opportunities that were successful to the point of being introduced to the market. The analysis does not account of the potentially larger set of opportunities that existed in the sector, but were either not attempted by the entrepreneurs or did not reach the end of product development. The opportunity set is thus subject to two sources of sample attrition. One is because of the ‘exit’ of opportunities that entrepreneurs abandon at some stage of the development process, because no longer deemed as worth pursuing (Dimov 2010b). Another is because entrepreneurs may close their business activities being unable to sustain the venture (either before an opportunity can be successfully realized, or after it manifests its failure), or because entrepreneurs decide selling the company, for example when opportunities have great potential for expansion. Addressing the latter source of sample attrition would require monitoring business founders from their nascent phase and over a longer

period of time so that also entrepreneurial exits are included. Dealing with the former would entail observing opportunities across different activities and stages of new-product development. In fact, the shape of the distribution is likely to evolve over time and map into different individual and contextual factors, as new concepts are perceived, selected, and developed into commercially viable new products (Brown and Eisenhardt 1995). Reid and De Brentani (2004) argue that the role of individuals and organizations in up-front activities of new-product development, what has been labeled as the ‘fuzzy front end,’ differ between discontinuous new-product innovation and incremental product innovation (which partly overlaps with the Schumpeterian–Kirznerian distinction). Specifically in the case of discontinuous new products, it is the role of individuals, and in particular of those performing boundary-spanning activities, to identify, structure, and collect information about opportunities, while for incrementally new products this role pertains to organizations (Reid and De Brentani 2004). As for the attributes we have considered in this study, one could expect that an entrepreneur’s risk propensity and creativity would be more important for decision making in up-front activities like idea generation and screening, while the founder’s experience and proactive behavior would matter more for mobilizing resources (e.g., financial) at later stages of product development, such as testing and product launch (Arrow 2000). Exploring these connections would require documenting how entrepreneurs assess the nature of an opportunity on the Schumpeterian–Kirznerian scale, across the different activities and stages of opportunity development, from idea generation and search to product launch. When doing so, a related limitation is that our sample included only high-tech small firms, but obviously it would be relevant to replicate this study in broader samples, in which a higher share of Kirznerian opportunities may be anticipated.

Next, the bipolar measure of opportunity type proved to be satisfactory in terms of reliability, and convergent validity of its dimensions (significant CFA model with good fit). The results of the regression analyses provide some support for criterion validity as we did find significant relationships with some of the constructs to which both opportunity types have been related in previous conceptual contributions. However, more can be done to validate the measure by

applying it in other contexts, and by testing how the measure behaves in a full nomological network of relationships with other theoretically related constructs.

Third, our study does not account for the economic value of different opportunities. Economic growth takes place not only because of the Schumpeterian process of creative destruction, but also because of the reallocation of resources that, according to Kirzner, were inefficiently used before introducing an innovation (Douhan et al. 2007). Further longitudinal work on the distinction between both types could shed a light on how Schumpeterian and Kirznerian opportunities interact to enhance enterprise performance and economic growth (Holcombe 1998; Fu-Lai Yu 2001).

Last but not least, the type of relationship we observe is an association between the Schumpeterian–Kirznerian scale of opportunities and a number of covariates. Some of these covariates such as the entrepreneur's age and education can be considered exogenous to the nature of opportunities, while others, like those expressing technology and market conditions, could be considered partly exogenous, to the extent that small firms (85 % of firms in our sample have less than 50 employees) assume their environment as given. However, theoretical considerations about the opportunity-individual nexus suggest that the causality is bidirectional in when it involves heterogeneous perceptions and behaviors, especially in presence of uncertainty when individuals need to formulate expectations about the value of an opportunity (Dew et al. 2004). An opportunity can be initially perceived as small and contingent on a specific-market niche, but more ambitious entrepreneurs will do their utmost to find resources and invest time and effort to develop the idea and enhance its impact on the market, beyond what was initially envisioned. On the other hand, an opportunity that reveals its potential at early stage may change the behavior and strategic vision of the entrepreneur, as well as their perception of external influences. As the opportunity develops entrepreneurs will only continue to pursue the opportunities in which they are confident (Dimov 2010a, b). To disentangle these causal mechanisms, which are intimately bound in the entrepreneurial process, a qualitative approach seems necessary, which would allow to assess the evolution of an opportunity from its outset to market exploitation, in connection with the decision-making path that

the entrepreneur follows as the opportunity takes shape.

Some practical implications can be draw for policy makers and those with a professional interest in understanding entrepreneurs. In most developed countries, innovation and entrepreneurship policies are often biased toward the pursuit of Schumpeterian opportunities, which are seen as means to achieve potentially greater and better-anticipated impact on long-term growth and knowledge spillovers (Stam 2008). In our study, the coexistence of Kirznerian opportunities with Schumpeterian opportunities even in a high-tech environment warns against completely ignoring Kirznerian entrepreneurship when the objective is to stimulate economic growth. While Schumpeterian opportunities and entrepreneurs are important for discontinuous change, Kirznerian entrepreneurs can play an important role as they are generally present in larger numbers and can ensure innovation diffusion (Stam 2008). Simultaneously, our findings suggest that in order to identify the kind of entrepreneurship which is usually associated with breakthrough innovations, an explicit strategic focus, proactive behavior and experience will be helpful indicators, as will be general demand growth.

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