Internationalization of Entrepreneurial Firms: 
Leveraging Real Options Reasoning through Affordable Loss Logics

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ABSTRACT
Using a transaction-level analysis of 1,040 small lumber exporters from 52 countries, we develop and test a framework wherein internationalizing entrepreneurs pair affordable loss logics (ALL) with real options reasoning (ROR) to generate value-creating opportunities while substantively forestalling the unfavorable impacts of trade partner opportunism. Through this, our study extends the literature on international market entry by identifying novel mechanisms employed by entrepreneurs to navigate the cross-currents lying between opportunity and opportunism. In addition, we offer fresh insights to the ongoing debate concerning the applicability ROR to business venturing contexts. By bridging ROR and ALL, our study extends and enhances efforts to apply ROR as a descriptor and predictor of market entry decisions.

Key words: Market Entry, International, Entrepreneurship, Real Options Reasoning, Affordable Loss Logics, Opportunism

1. Introduction
Although the proliferation of entrepreneurial firms with international aspirations is evident in virtually all industries and markets (Oviatt & McDougall, 2005; Reuber, Dimitratos, & Kuivalainen, 2017), significant obstacles persist for entrepreneurial firms seeking access to new markets for their goods and services (Clarke & Liesch, 2017; Shrader, Oviatt, & McDougall, 2000), ranging from uncertain local market demand to broken supply chains, and from currency exchange volatility to shifting cultural norms (Deng, Jean, & Sinkovics, 2018; Kraus et al., 2015; Schweizer, 2012). Chief among these concerns is the threat of default risk, involving potential non-payment from international customers. In fact, 79% of small business exporters identified customer defaults as a major concern (NSBA, 2013). Compounding this problem, small-scale exporters often have no legal recourse in the event of defaults or contractual disagreements with foreign market customers (Cavusgil, et al., 2004).

Non-payment by international customers is a form of opportunism, a challenge long recognized by international business and marketing scholars (e.g., Aulakh, Kotabe & Sahai, 1996; Wathne & Heide, 2000). Opportunism -- defined by Williamson (1993:98) as “self-interest seeking
behavior with guile” -- in this context refers to violations of explicit or implicit contracts\(^1\) between two parties (Verbeke, Ciravegna, Lopez & Kundu, 2019). Due to the difficulty of enforcing contracts in foreign countries with unfamiliar or weakly developed legal systems (Zhou & Xu, 2012), opportunism presents a major source of downside risk for international business transactions (Wathne & Heide, 2000). Extensive research has addressed how firms can mitigate opportunism through governance choices; for example, by internalizing foreign operations through foreign direct investment (FDI) (Hennart, 1982; Hill, 1990; Zhou & Xu, 2012). Researchers have also examined how opportunism in existing trading relations between exporters and importers can be reduced (e.g., Aulakh et al., 1996; Cavusgil et al., 2004; Ju, Murray, Kotabe & Gao, 2011; Wu, et al., 2007), but have concluded that these downside risks cannot be fully eliminated (Deligonul et al., 2006; Verbeke et al., 2019; Wathne & Heide, 2000), especially for small firms.

Despite the persistent threat of trade partner opportunism, the pursuit of new opportunities in international markets is an important path to growth for many business ventures (Deng et al., 2018). Yet, for many entrepreneurial firms, the value of international market opportunities is often unknown at the time of an entry decision, since it is contingent upon gaining access to new business networks, where new and small firms are hampered by a “liability of outsidership” (Johanson & Vahlne, 2009). Successful entry into these new networks requires these ventures to balance the risks of opportunism – which often take the form of customer non-payment – with the unknown future value of new trading relationships. Whereas much of the existing literature focuses on internalization among multinational firms and the management of opportunism in established trade relationships (Brouthers et al., 2008; Ju et al., 2011; Katsikeas, Skarmeas & Bello, 2009), scholars know much less about why and how new and small firms balance the tensions between the known

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\(^1\) Recently, some scholars have argued for the broader concept of ‘bounded reliability’ which includes opportunism as well as guile-less reasons why a party might violate a contract.
downside risks of partner opportunism and the unknown future value of specific new market entry decisions, as they take the initial leap of faith into unknown foreign markets. In general, there is an under-theorization regarding the manner in which “entrepreneurs can economize on bounded reliability [opportunism] from foreign partners when entering new markets,” especially when firms lack “the requisite resources to internalize transactions” (Verbeke & Ciravegna, 2018: 391; Ciravegna et al., 2019). Accordingly, the purpose of this study is to explore two interrelated questions: (i) Why are entrepreneurs willing to engage in international market entry when doing so exposes them to the significant threat of opportunism? and, (ii) How can entrepreneurs effectively manage the potential losses caused by opportunism while pursuing unknown future value creation opportunities through international expansion?

In addressing these two unresolved questions, we develop and test a novel application of real options reasoning (McGrath, Ferrier & Mendelow, 2004; Chi, Li, Trigeorgis, & Tsekrekos, 2019) to the description and prediction of why and how entrepreneurs navigate between the threat of opportunism and allure of value-generating opportunities (Hunt & Hayward, 2018). Real options are discretionary investments that provide firms with the right, but not the obligation, to take strategic action at some point in the future (Dixit & Pindyck, 1994; Reuer & Leiblein, 2000). As Adner and Levinthal note, “The underlying logic of real options is based on the realization that future investment opportunities are contingent on prior investment commitments” (2004:74). Real options reasoning (ROR) suggests that, even when a precise valuation of real options is not feasible, decision-makers use real option logic as a heuristic to account for the option-like unknown future value tied to an investment (Trigeorgis & Reuer, 2017). For example, entrepreneurs engage in transactions even in the face of potential default risk when the future value can be created over and above the returns from an initial transaction (Bosse & Arnold, 2010).
Thus, by invoking ROR, we explain why some decision-makers may be willing to bear the deleterious risks attendant to exchange partner opportunism in pursuit of new opportunities (Verbeke & Ciravegna, 2018). However, the stepping-stone strategies borne out of the decision-making logics of ROR do not convey how new and small, resource-constrained business ventures simultaneously pursue growth and thwart opportunism. For this, we build upon the notion that affordable loss logics (ALL) (Martina, 2019; Shackle, 1966) are utilized as a complement to ROR in providing self-regulating safeguards when making international exporting decisions. The use of ALL allows these small exporting firms to limit downside risks through controlled expansion into new international business networks. We test this ROR-ALL linkage through transaction-level data from 1,040 small lumber exporters in 52 countries. Consistent with our hypothesized relationships, we find that ROR and ALL are both positively related to internationalization, as measured by the amount of revenue generated from each new international market entry. In addition, ALL further strengthens the positive relationship between ROR and internationalization.

Our study makes several contributions to international entrepreneurship research while also broadening and deepening the theorization of ROR and ALL as decision strategies under conditions of uncertainty (Townsend et al., 2018; Yan, Williams & Hunt, 2020). First, we contribute to the literature on opportunism in international market entry (Verbeke & Ciravegna, 2018; Verbeke et al., 2019) by explicating the mechanisms through which growth-minded entrepreneurs can balance the tensions between downside risks and uncertain gains attendant to the creation of international market opportunities (Peng et al., 2020; Townsend et al., 2018). Although much of the literature on opportunism in international contexts has focused on how to avoid these downside risks (e.g., Verbeke & Ciravegna, 2018), results from our study suggest that with the combined use of ROR and ALL, entrepreneurs can effectively balance the downside risks
of opportunism while still pursuing uncertain, value-creating opportunities. In addition, by bridging ROR and ALL, we offer fresh perspectives to the ongoing debate over the applicability of real options theory to the entrepreneurship literature (Adner & Levinthal, 2004; McGrath & Nerkar, 2004). Although some have suggested that ROR and ALL constitute competing conceptions of entrepreneurial decision-making (e.g., Dew et al., 2009), we demonstrate that they actually operate in complementary fashion through “act-and-see,” stepping-stone strategies. In the following section, we lay the groundwork for this reconceptualization.

2. Theory and hypotheses

2.1 International Entrepreneurship: Navigating Opportunism and Opportunities

Consistent with McDougall and Oviatt (2000:902), international entrepreneurship (IE) is defined as “a combination of innovative, proactive, and risk-seeking behavior that crosses national borders and is intended to create value in organizations.” The literature on international entrepreneurship (e.g., Autio, et al., 2018; Reuber, et al., 2017) and SME internationalization (e.g., Lu & Beamish, 2001) emphasizes the notion that new and small firms confront a high degree of both risk and uncertainty when entering foreign markets. In entrepreneurship theory, careful distinctions are made between risk and uncertainty based on the extent to which future outcomes of decisions are a priori measurable and knowable, or unmeasurable and unknowable (Knight, 1921; Townsend et al., 2018). In international entrepreneurship, firms face a vast array of risks and uncertainties arising from host-country conditions (Shrader et al., 2000), liabilities of foreignness and outsidership (Johanson & Vahlne, 2009; Zaheer, 1995), and opportunistic behavior by foreign business partners (Cavusgil et al, 2004; Verbeke & Ciravegna, 2018).

A rich literature has examined the downside risks of opportunism in international business transactions. Entry mode studies in the tradition of internalization theory (Buckley & Casson,
1976; Hennart, 1982; Hunt, 2013) tend to view opportunism as a problem that can be avoided through modes of governance; for instance, by pursuing foreign direct investment (FDI). Another research stream has investigated how exporters can minimize the risks of opportunistic behavior through the use of formal contracts and trust-based relationships (Aulakh et al., 1996; Cavusgil et al, 2004; Dyer & Singh, 1998). Recently, however, scholars have argued that the literature’s focus on the avoidance of opportunism has left important gaps in our understanding of how firms cope with scenarios in which opportunism cannot be fully eliminated (e.g., Verbeke et al., 2019).

International entrepreneurship abounds with situations in which downside risks must be tolerated, or even embraced, in order to pursue uncertain new opportunities for value creation (Autio et al, 2018; Zander, McDougall-Covin & Rose, 2015). One such context is foreign market entry through exports. Young and small firms seeking to export to a new foreign market for the first time face substantial uncertainty about the future value of expansion through exports, in part because of the need to transact with unknown foreign business partners (Aulakh et al, 1996; Cavusgil et al, 2004). For small, resource-constrained firms, FDI is simply not feasible (Verbeke et al., 2019). Equally important, new and small firms’ limited knowledge of local market and lack of pre-existing, trust-based business relationships (Deligonul et al, 2006; Katsikeas et al, 2009; Wu et al, 2007) creates a liability of outsidership that keeps new firms on the periphery of local business networks (Johanson & Vahlne, 2009). Given these contextual challenges, default risk – the specter of an exporter not receiving payment for goods or services that have been rendered – is a palpable concern for entrepreneurial firms with modest administrative and legal resources.

2.2 Balancing the Tension between Risk and Uncertainty through Real Options

Real options, classically conceived, are investments in projects that give the option holder future preferential decision rights (Bowman & Hurry, 1993; Trigeorgis, 1996). The primary source
of value is in the strategic flexibility gained by a firm’s management for the right but not the obligation to exercise, defer, hold, stage, bundle or abandon future investment (Trigeorgis, 1996). The conceptual heritage of real options is rooted in use of financial options, which are derivative securities whose value is imputed from an underlying asset, typically a commodity or financial instrument that can be freely traded for the right, but not the obligation, to buy or sell the underlying asset at some point in the future (Black & Scholes, 1973). Financial options have been employed since the 17th century, but breakthrough theorization of pricing models by Black and Scholes (1973) and Merton (1973) situated financial options at the heart of modern financial economics.

The development of real options sprung from insights by Myers (1977), who conceptualized them as an analog to financial options, wherein the project value of a firm’s discretionary investments provides decision rights that function similarly to financial options. Real options differ from financial options by conferring preferential rights for access to proprietary knowledge or beneficial capabilities, while financial options simply transfer commoditized rights to buy or sell an underlying asset for some contracted period of time (Li, 2007). Unlike financial options, which can be bought and sold by anyone who is so inclined, the “privileged access to resources” accompanying real options has the potential to provide a unique strategic advantage to option holder (Bowman & Hurry, 1993; Buckley & Tse, 1996).

Real options serve as an analytical tool, particularly in finance and economics (Brealey, Myers & Allen, 2006), where the focus is on modeling optimal responses to circumstances characterized by irreversible investments under conditions of a priori uncertainty, including: natural resource exploitation (Brennan & Schwartz, 1985), investments in flexible manufacturing (Triantis & Hodder, 1990), land development timing (Titman, 1985), operating scale alterations, and the determination of firm value (Pindyck, 1988; Majd & Pindyck, 1987). Through these and
related analyses, scholars identified real options that are often embedded in discretionary investments: deferral options, options to stage investments, options to alter the operating scale, abandonment options, switching options, and growth options.

Interest in real options among strategy scholars was initially sparked by dissatisfaction with net present value analyses in the assessment of strategic decision-making (e.g., Hayes & Garvin, 1982). Whereas financial options are concerned with stocks, a strategic or real option is an option to make a future decision about almost any real asset or real project. This flexibility is what makes the option valuable, because decisions are postponed until the uncertainty about the future value of the option is resolved, thus balancing the tension between the pursuit of upside potential gains and while limiting downside risk (Kogut & Kulatilaka, 2001). Kogut (1985, 1991) was the first to formally conceptualize and empirically test the use of real options in strategic management. Subsequently, real option logics have been applied in a wide array of strategic decision-making contexts, involving the determination of when options are exercised (Bowman & Hurry, 1993; Chi, 2000; Folta & Miller, 2002; Kogut, 1991), when options actually exist (Posen et al. 2017; Reuer & Tong, 2007), market entry timing (Ciravegna, et al., 2019; Folta & Miller, 2002; Hunt, 2013), and technology sourcing method (McGrath, 1997; Santoro & McGill, 2005). Crucially, the real options approach departs from the financial analogy in that decision makers do not have to passively react to uncertainty when investing in a real option, but instead can actively embrace uncertain future opportunities while limiting downside investment risks thereby increasing the chances that the investment strategy “pays off” (McGrath, 1999).

2.3 International Opportunity Exploration through Real Options Reasoning

In this sense, real options possess value because managers can “wait and see” if and how uncertainties are wholly or partially resolved so that a more confident basis for additional
investment can be made. Scholars have shown that firms can use the “wait and see” strategy, i.e. a strategy resulting from a measured decision of active waiting, to manage risks in the internationalization process (Clarke & Liesch, 2017). The exercise of real options creates asymmetric value (Chi et al., 2019), because the ability to “wait and see” limits a firm’s downside losses while maintaining the potential for uncertain upside gains (i.e., Knight, 1921). This is the classical conception of real options (Trigeorgis, 1996). It is precisely this managerial flexibility that differentiates real options from other generic forms of path-dependent investments (Adner & Levinthal, 2004; Jahanshahi et al., 2015).

ROR, on the other hand, reflects “the premise that resources create the future potential for decision makers to act in ways that could not have been foreseen at the time a specific investment decision was made” (McGrath, et al. 2004: 88). Under these conditions of a priori irreducible uncertainty (McGrath, 1999) concerning the future value of different options, ROR extends beyond traditional models of real options by incorporating strategic actions that are enacted to create new opportunities through exploration (e.g., Hunt & Song, 2015; Posen, Leiblein & Chen, 2017). This is tantamount to “act and see.”

ROR has been widely adopted in existing research on internationalization and risk (Eduardsen & Marinova, 2020), such as the choice of governance mode (Brouthers, et al., 2008; Reuer & Tong, 2005), international market entry and exit (Clarke & Liesch, 2017; Tong, et al., 2008), and international diversification (Krapl, 2015). However, most studies have examined the role of ROR through the lens of multi-national corporations, while relatively little attention has been accorded new and small, resource-constrained firms Among entrepreneurial firms with international aspirations, the initial exploratory investments typically take the form of the risks and uncertainties attendant to export transactions.


2.4 Compensatory Real Options and Exploratory Activity

In this paper, we define internationalization as a strategic activity involving the sale of goods and services to new customers in new markets (Jones, Coviello & Tang, 2011). Firms can pursue internationalization through various modes of entry (Calof & Beamish 1995). Product export is by far the most common, constituting more than 90% of the international trade transacted by very small firms (OECD, 2015). Broadly speaking, there are two means through which exporting entrepreneurs can transact business: those in which payment is received prior to shipping, and those in which payment is made by the importer after the goods are received (Ibeh, 2003). Receipt of payment post-shipping requires extending credit through terms of trade, which exposes the exporter to opportunism in the form of default risk. The risk of non-payment is even higher when small exporters are dealing with unfamiliar rules and norms, and the when they cannot effectively enforce contractual protections (Verbeke, Ciravegna, Lopez & Kundu, 2019).

To answer our first research question -- Why are entrepreneurs willing to engage in international market entry when they are exposed to high risks of opportunism? -- we turn to the theory of real option reasoning. Typically, an exporting entrepreneur who offers trade terms (i.e., shipment on credit) is not fully compensated at the time of the transaction. There are two reasons for this: (i.) they are not compensated for the time value of money; and, (ii.) they receive no financial consideration for the risk of non-payment (Bosse & Arnold 2010; Peterson & Rajan 1997). Theoretically, an internationalizing entrepreneur should either insist upon full payment up-front or charge a substantially higher price for sales made on credit to unknown foreign buyers. However, this calculus does not consider the possibility that the extension of credit to unknown counterparties may generate additional value down the road. As one owner in our study stated:

“Defaults are the biggest worry I have about credit to foreign customers. If they won’t pay me, how exactly do I go about getting either my money or my lumber back? So, I issue credit with my fingers crossed, hoping it opens doors for me.” – Firm #773
Consummating a transaction with the possibility of full loss is an irreversible decision, but it is also one that is made with an eye on future opportunities to transact additional business through a new network (Dixit & Pindyck, 1994). In these cases, value can be created through the willingness of entrepreneurs to bear uncertain future gains that might be generated through the option of market expansion at some point in the future. To this point, an owner told us:

“Selling on consignment [note: consignment involves receiving payment after the goods are sold] is just a high-risk foot in the door. New customers don’t know me from any other small outfit, but they will if I can get their attention by giving them credit” – Firm #512.

Since these options are created when the exporter is incompletely compensated at the time goods are transferred, but are factored into the decision-making process of the exporter who issues risky credit, we refer to this as a compensatory real option, reflecting the manner in which the opportunity for future compensation is created through a relationship-driven, exploratory investment decision. It is compensatory in the sense that firms hope to be compensated with future, downstream opportunities as a reward for bearing such irreducible uncertainties. Thus, the incremental value that is created through generous trade credit is a Compensatory Real Option (CRO). CROs are definitionally options, since they exhibit each of the requisite characteristics (Chi et al., 2019). First, the value of CROs is created through flexibility to the exporting firm in the form of future, downstream opportunities that are created through referral-based transactions with new customers, which in turn, are created through trust that is formed only by an “act and see” strategy under conditions of uncertainty. Second, the downside risks of payment default wrapped up in the initial investment – consisting of the value of the goods being exported on credit – are irreversible. In this sense, the uncertain future stream of payments is dependent upon irreversible commitments, formed by sequential acts, commencing with an initial investment at the time of the transaction. This resembles traditional real options, but with one key difference:
full compensation equals or exceeds the cost of the option *if and only if* the exporting firm is compensated at some future point in time through the potential creation of new opportunities.

The expectation that transactions will create future opportunities in the form of a new stream of payments represents the use of ROR. Our argument makes two important assumptions. First, entrepreneurs pursuing CROs are boundedly rational (Simon, 1957), such that they will not accept a deal that is self-evidently a “sure loss”. We assume that even “desperate” business owners will decline business rather than accepting a complete loss. Second, extending extant research (McGrath & Nerkar, 2004), we assume that when making investment decisions, decision-makers implicitly (or explicitly) take the possibility of future opportunities into account, even though the creation of future opportunities is an endogenous uncertainty (Chen et al., 2020) that cannot be described or measured *a priori* – it is therefore, an irreducible uncertainty (McGrath, 1999). The uncertainty is both endogenous and irreducible because its resolution is not based on the ability to collect additional up-front information or naturally resolved by the passage of time. Rather, the reduction of this type of uncertainty is solely contingent on the subsequent decision-making of one or both transacting partners (Hunt & Song, 2015; McGrath, et al., 2004). As one owner noted:

“When I ship to a new foreign customer on credit, I have no idea whether or not I’ll get full payment,” said one owner, “but if I don’t ship on credit then one thing is for certain: I’ll never get new international customers.” – Firm #218

To address our first research question, we argue that entrepreneurs are willing to engage in international market entries despite the downside risks of not receiving payment because they expect a given transaction can generate CROs in the form of future opportunities that are only created through the initial action taken by the entrepreneur (Lerner, Hunt & Dimov, 2018). The generation of CROs further promotes internationalization. The function of an exchange that involves no CROs, and thus no opportunity creation, is strictly transactional. The function of an exchange that generates CROs is to create new opportunities that lead to internationalization (i.e.
entering new international product markets). Thus, there should be a close association between CROs and the achievement of internationalization aims. Additionally, the number of CROs also indicates the value of flexibility created from real options. Firms with more CROs have a larger option pool (i.e. the number of new international product-markets to enter) from which to choose. As the number of CROs increase, the quality of options and the likelihood of selecting more favorable options increase. Therefore, having more CROs not only provides firms with more international market opportunities, but also increases the likelihood of pursuing high-quality international market opportunities, which improves a firm’s internationalization performance such as the amount of revenue generated from each new market entry. Therefore, we predict:

**Hypothesis 1**: The generation of compensatory real options is positively related to internationalization.

### 2.5 Affordable Loss Logics and Exploratory Activity

As the foregoing examination of CRO generation demonstrates, the compensatory function of real options provides a theoretical basis upon which to address the first of our two research questions; namely *why* entrepreneurs would employ ROR in pursuing new market entry. The second question we examine in this paper is *how* they actually do it. In reality, counter-party defaults will occur, which not only eliminates the prospect of generating a CRO, but also the prospect of receiving payment for goods and services that had already been delivered. Accordingly, while delaying payments might create the possibility of future opportunities, such strategies also increase the downside risks associated with non-payment, potentially leading to “option traps.” Adner and Levinthal (2004) argued that the chain of sequential investments based upon real options logics, as posited by McGrath (1999), are susceptible to runaway spending on high-risk pet projects characterized by “creeping commitment and excessively optimistic bold moves.” In these situations, Adner and Levinthal believe that there is a high likelihood that
incomplete or insufficient project-level discipline will result in portfolio sub-optimalities. Under these conditions, real options investment strategies lose their power to balance the asymmetric tensions between downside risks and uncertain future gains.

Besides the looming specter of option traps, several other factors have generated skepticism regarding the applicability and advisability of ROR. Scholars who have advocated organizational structures explicitly designed to motivate managerial discipline in resource allocation have primarily focused on large-scale, well-resourced, multi-national corporations that potentially have scores or even hundreds of long-lived projects, each requiring sequential positioning investments; such as R&D portfolios (McGrath & Nerkar, 2004; Ross, Fisch, & Varga, 2017), international joint ventures (Reuer & Leiblein, 2000; Tong et al., 2008), alliances (Calof & Beamish, 1995), and mergers and acquisitions (Reuer et al., 2004). In these large organizational contexts, resource allocation discipline needs to be enforced through organizational structures that ensure accountability through checks and balances (Adner & Levinthal, 2004; Coff & Laverty, 2001). The analogous regulatory process in a small firm involves the use of affordable loss logics (ALL). Shackle first took note of ALL in entrepreneurial decision-making:

“It is practical and reasonable to regard the focus-loss, in absolute terms, as depending on the nature and scale of the enterprise concerned. Thus, [the entrepreneur] can adjust the greatest amount he stands to lose, that is, his focus loss, to the amount which, he can “afford” to lose.” (Shackle, 1966)

What Shackle is proposing is that entrepreneurial decision-making, particularly in the context of opportunity search and risk (Hunt, 2018), will focus on the “affordability” of an exploratory mission. ALL is a strategy of explicit action that is by nature exploratory, which enables entrepreneurs to pursue a broader range of possible outcomes from any entrepreneurial act (Dew et al., 2009; Sarasvathy 2006). Effectuation theorists have incorporated Shackle’s (1966) notion of affordable loss to provide guidance for entrepreneurs to focus on controlling the amount
of loss that is affordable rather than predicting and maximizing potential returns (Sarasvathy, 2009). ALL is one of the four principles of effectuation (Read et al., 2009; Sarasvathy, 2006), and is – in a fashion similar to our characterization of ROR above – an “act and see” orientation, rather than “wait and see.” Our approach complements effectuation theory (Sarasvathy, 2009) in that the value creation process stems from ongoing interactions of exporters with transaction partners who are instrumental in creating downstream opportunities with other members of a business network (Karami, et al., 2019). However, whereas effectuation theory addresses the specific problems of goal ambiguity in the design and emergence of new business venturing projects (Hunt et al., 2019), our complementary ROR approach broadens the discussion to encompass situations where there is no goal ambiguity or product uncertainty. A conjoint view of ROR and ALL posits that while the positive effect of CROs on internationalization encourages the use of ROR, ALL safeguards firms from falling into “option traps” and the inability to contain loss (Adner & Levinthal, 2004), which would discourage entrepreneurs from pursuing new opportunities.

Thus, in response to our second research question, we submit that entrepreneurs can effectively manage the potential losses associated with opportunistic behaviors by employing ALL. In the context of small, sequential investments designed to facilitate the exploration of uncertain domains, internationalizing entrepreneurs who employ ALL – and, who have higher levels of affordable losses – should be more inclined to embrace the potential opportunities created from such inherently uncertain choices, because ALL heuristics aim to conduct explorations that are provocative, frequent and fast, while protecting firms from imprudently large bets that may go awry (Dew et al., 2009). Therefore, the entrepreneur accrues the value of ALL safeguards even while embracing uncertainty through an “act and see” approach. Higher levels of affordable loss
are expected to lead to more international market entries and higher revenue generated from each international market entry.

**Hypothesis 2:** The use of affordable loss logic is positively related to internationalization.

### 2.6 Combining Real Options Reasoning and Affordable Loss Logics in Exploratory Activity

Recent treatments of ALL have tended to juxtapose ALL against NPV and ROR as a robust predictor and descriptor of experienced entrepreneurs contemplating the plunge decision (Dew et al. 2009). While we agree with the mutually exclusive relationship between ALL and NPV, we argue that ongoing, exploratory resource allocations allow for highly complementary roles for ALL and ROR. Both ALL and ROR are expressive of the “act and see” heuristic that characterizes a resource-constrained, small firm’s intent to explore uncertain domains in search of new opportunities. As complementary components of an “act and see” heuristic, ROR and ALL work in tandem to move beyond the “wait and see” premises of the classical use of the real options framework. Adner and Levinthal (2004) diagramed the difference in this fashion (Fig. 1):

[Insert Figure 1 about here]

What Adner and Levinthal sought to convey is that the difficulty faced by scholars investigating the use of real options involves specification and identification. If ROR is in some sense a heuristic, what evidence is there that ROR actually occurs as opposed to one of several other path-dependent allocation schemes already expressed in the organizational literature? When entering the frontier of new opportunity creation (Hunt, 2018) – where the target market and technologies are indeterminable – Adner and Levinthal argue that the applicability of real options must give way to existing theories of searching, probing, learning and innovating (2004:76).

Our view of internationalizing entrepreneurs is that ROR and ALL, when conceptualized as functioning in tandem, provide a more robust description and prescription for small-firm
opportunity exploration. While small-breadth applications of real options theory have tended to focus on slack search, project-level assessments, and finite resource allocation (Adner & Levinthal, 2004), the use of ROR within the realm of small-firm opportunity exploration is one of enablement, whereby entrepreneurs evaluate their capabilities (Kogut & Kulatilaka, 2001), endeavor to create new opportunities (Alvarez & Barney, 2007) and generate new, value-generating resources under conditions of irreducible uncertainty (McGrath, et al. 2004). Building upon this more expansive view of ROR, our conception offers an alternative perspective in which the combined heuristics of ROR and ALL provide explanatory power beyond the original boundaries that Adner and Levinthal demarcated. Our theory (Figure 2) situates the conjoint use of ROR and ALL as the “stepping stone” mechanism through which entrepreneurs are able to monetize a priori irreducible uncertainty through “act and see” logics. We theorize that when irreducible endogenous uncertainty is very high, then ROR and ALL will create conditions for an “act and see” approach.

[Insert Figure 2 about here]

The combined use of ALL and ROR aims to create a cascading effect on future opportunities, the nature of which is captured in Figure 3. For example, in 2000, the U.S.-based firm Gulf Lumber initiated sales of hickory planks to Pride Designs, a Russian flooring company. By 2005, Pride used Gulf for cherry and pecan as well as hickory as Gulf benefited from Pride’s Eastern European connections to begin exports to Poland and the Czech Republic. Solely from the Pride relationship, Gulf created four new business opportunities. In 2009, the Polish connection led to customers in Latvia, Estonia, and Lithuania, further expanding Gulf’s international reach.

[Insert Figure 3 about here]

By using ROR, firms are more likely to accept additional default risk in pursuit of future possible downstream opportunities, thus creating more CROs. By actively tolerating higher levels
of affordable loss, firms are more likely to further pursue each new opportunity generated from the initial option since the *raison d’etre* of a CRO is the creation of new opportunities for internationalization. Therefore, over and above the independent effects of ROR and ALL on new market entry, we predict a significant interaction effect, as well:

**Hypothesis 3**: *The use of affordable loss logic strengthens the relationship between CROs and internationalization.*

3. Methodology

3.1 Research Context

Transaction-level data to examine entrepreneurial strategy are rare. For this reason, a key research design decision involved industry selection. After an exhaustive screening process, we chose the lumber industry for several reasons. First, the industry definition for lumber is near universal. The category consists of finished timber and refers to wood that has been fashioned into boards, planks, or other structural members of standard or specified length. Therefore, the industry solidifies boundary conditions around the underlying phenomena by eliminating problems concerning product uncertainty, goal ambiguity, and/or product differentiation strategies coupled with premium pricing to cover export risks. Second, transaction-related data for the industry are plentiful and accessible. The markets for lumber are large and transparent; electronic spot markets for lumber grades are easily tracked. Measurement methods, transport logistics and quality grading systems are well established. Third, lumber is a global industry, with producers and consumers in more than 180 countries. The quantity and diversity of companies is immense and the industry is highly fragmented, allowing for new niches to continually emerge. Fourth, the industry is heavily driven by business relationships. Vertical integration is virtually non-existent, so firms grow by forming partnerships. Lastly, there is a significant presence of sequential decision-making in the market entry strategies of lumber exporters, with high uncertainty regarding future opportunities.
3.2 Data Sources

In order to focus on very small firms specializing in the production and sale of lumber, we started with an initial list of 61,242 companies from 171 countries in the broad category of wood products. Sources for this list consisted of the Global Wood Trade Network, TimberWeb, National Hardwood Lumber Association, Hardwood Manufacturers Association, and International Wood Products Association. We set a target revenue range of $500,000 to $5,000,000 to ensure that firms were large enough to engage in international transactions, but small enough that opportunism is credible risk and a retrospective analysis of their respective export histories was not unwieldy. Further, firms with revenue below $5MM are unlikely to have the legal and administrative expertise to litigate non-payment, or the financial and operational resources necessary to engage in foreign direct investment. From the initial pool, we eliminated 45,458 companies engaged in either raw timber or finished wood products. 11,778 additional firms were eliminated because they did not export or fell outside the revenue range, leaving 3,570 lumber exporters, domiciled in 52 different countries. This population constituted the final survey frame.

Firms were initially contacted via mail in 2014, with follow-up information gathered through 2017. Participating firms were given the option of responding by mail or online, using a Qualtrics survey. Up to two follow-up e-mails and phone calls were conducted to encourage participation. Consistent with prior studies that successfully drew reliable historical data from large samples of single respondents (Coles & Hesterly, 1998; Leiblein & Miller, 2003), a detailed survey was sent to a key informant in each firm. The survey, which was usually completed by the owner-operator and his or her financial staff, requested detailed information about each firm’s export chronology, using the series of historical transactions captured through TimberWeb. For the oldest
firms in the study, this meant collecting thirty-seven years of data, extending back to 1983. The youngest firms in the study were just three years old and had data extending back to 2014.

Respondents completed a grid by-year for each international market to which they exported, indicating the countries to which exports were shipped, the number of shipments, the terms of trade and, if applicable, which export transactions led to new product offerings and new markets. Since TimberWeb indicates when transactions occur, but does not have the ability to link one customer to another, firms completing the export chronology indicated for each export transaction whether the transaction occurred as a consequence of existing exchange customers. For example, J&R Lumber of Stevensville, Montana, transacted three export sales in 1993, their third year of international shipments. Two of the export sales occurred through connections with existing customers and one involved an entirely new export partner. In completing the chronology, J&R would indicate whether exports extended existing relationships as well as the trade credit terms. While the overall number of transactions comprising our study is large (87,941), on average, firms in the study transacted just 6.12 international sales per year of operation and entered new markets at the rate of 0.18 per year, meaning the burden attendant to completing the chronology was not onerous (less than twenty minutes on average) and the use of TimberWeb data ensured that the salience of new market transactions was high.

The overall response rate of 34% provided 1,214 completed surveys, 72% of which were completed online. Of these, 174 were excluded due to serious completion errors or because the firm fell outside the target revenue range. The remaining 1,040 questionnaires represented 32% of the surveyed firms, a response rate that is materially better than similar studies of small businesses, which tend to be in the mid-twent-percent range (Pielsticker & Hiebl, 2020), reflecting the relatively low response rates in surveys of business owners (Bednar & Westphal, 2006). Response
rates for U.S.-based firms was 37% and for non-U.S. firms 23%. Among non-US respondents, 65% were from countries where English is not the primary language, thereby mitigating potential national-origin biases. To ensure there was no response bias, we used information drawn from TimberWeb to establish that the net sample did not differ significantly from the gross sample.

As our research required data that was proprietary to each firm and typically only accessible to owner-operators or senior financial staff, we relied on the survey to collect data for all the variables of interest. While this introduces the possibility of common method variance – especially in studies examining perceptual data (Podsakoff et al., 2003) -- this concern is mitigated by the factual nature of the data collected from informants concerning each firm’s export chronology, which respondents could readily retrieve from firm records and TimberWeb. To further assure the quality and reliability of our data, 171 of the respondents agreed to participate in follow-up telephone interviews. In addition to ensuring that the survey questions were understandable, the interviews confirmed that the written results were complete, accurate, and interpretable.

3.3 Dependent Variables

Our research design employed an OLS regression model to examine firm-level outcomes related to export arising as a consequence of heterogenous export strategies. The DV Total Internationalization (TI) indicates the extent to which firms achieved a broad-based, revenue-generating international presence. Following the logics of existing composite measures of internationalization (Carpenter & Fredrickson, 2001; Sullivan, 1994), we calculated TI as a ratio of international revenues to total revenues, where international revenues were weighted by the number of new international product-markets (NPM) entered per year of operations:

\[
TI = \frac{\text{International Revenue} \times \left(1 - \frac{1}{1 + \text{NPM per year of operation}}\right)}{\text{Total Revenue}}
\]
This scaled metric, ranging from 0 to 1, provides an aggregate measure of the relative success each firm has had in achieving diversified new market entry. We developed this formula using the following steps: first, we followed established measures of internationalization (Carpenter & Fredrickson, 2001; Sullivan, 1994) and calculated the ratio of international revenue to total revenue: \( \frac{\text{International Revenue}}{\text{Total Revenue}} \). Next, as our definition of TI more specifically captures the amount of international revenue relative to the number of new product markets they enter, we further calculated TI as \( \frac{\text{International Revenue} \times \frac{1}{NPM \text{ per year}}}{\text{Total Revenue}} \). However, using this formula could potentially punish firms with more new product markets. As \( NPM \) increases, \( \frac{1}{NPM \text{ per year}} \) decreases. In addition, the denominator can equal 0. To resolve these issues, we changed \( \frac{1}{NPM \text{ per year}} \) to \( 1 - \frac{1}{1 + NPM \text{ per year}} \). The intuition of the formula is that as the denominator \( 1 + NPM \text{ per year} \) increases, the term \( \frac{1}{1 + NPM \text{ per year}} \) decreases, which weights more heavily international revenues emanating from a broad assortment of foreign markets. In the specific context of very small internationalizing entrepreneurs, TI provides a reliable basis for examining the variance in revenues per NPM across lumber entrepreneurs. However, the metric moves beyond simply measuring the revenue per NPM, since doing so would assign a high rank to firms with a small number of large business relationships, but little overall internationalization in terms of market diversity.

3.4 Predictors

Compensatory Real Options (CRO). CRO is a continuous variable based on an aggregate measure of the new business opportunities that were directly facilitated by an existing international business partner. These potential opportunities were compiled for each firm from the export chronologies that were completed by each firm for each trading partner and market, based on TimberWeb transactions. The difference between CROs and NPMs is that CROs represent the real options for all of the opportunities that a firm has created, while NPMs are market opportunities
that are actually exploited, instances of which are recorded in the firm’s export chronology when a product is sold for the first time in a country as a consequence of an existing export relationship. In other words, not all CROs result in new product-market activity. For example, as shown in Figure 3, 11 multiple CROs are generated from the initial Pride Design - Gulf Lumber transaction, resulting in internationalization for Gulf into several new countries. The 1,040 firms in our study reported 87,941 transactions, from which 4,175 CROs were created and 2,642 NPMs were ultimately realized. As depicted in Figure 3, the CRO metric captures the extent to which new opportunities emerge from existing relationships, in a fashion that reflects sequential modeling employed in prior studies (McGrath 1999; Brouthers et al. 2008).

Affordable Loss Logic (ALL). This is a categorical variable consisting of the financing terms used by each entrepreneurial exporter. Financing term data were compiled through the export chronologies completed by each firm. As shown in Table 1, we have classified exporters into four categories based on the amount of upfront payment they require in their financing terms. Category 1 firms require full payment in advance, fully protecting the exporter. Conversely, Category 2-4 firms, to varying degrees (see Table 1), require no upfront payment prior to shipping the lumber. Such firms are, in this sense, activating ALL and face some level of affordable loss since the shipment is at partial (Cat. 2 & 3) or complete (Cat. 4) risk of non-payment.

[Insert Table 1 about here]

3.5 Controls
An array of control variables captures macro-economic, industry–specific, firm-specific and country-specific effects. Following prominent empirical examinations of internationalization (e.g. Rialp, Rialp, & Knight, 2005; Zahra, Ireland & Hitt. 2000) firm-level predictors included Firm Size (as the logged value of total employees), Firm Age, Firm Years of International Business Experience, Total Revenue, and International Revenue. To capture known macro and industry-
level determinants of internationalization and entrepreneurial action (Acs, Desai & Klapper, 2008), annual GDP Growth Rates and annual Lumber Industry Growth Rates were included for a firm’s home-country and partner-country. Unobserved Fixed Year Effects were controlled through a series of dummy codes. Controls were also included for home-country and partner-country perceived environmental uncertainty, which we operationalized through a measure of national distance. Since the complexities and ambiguities of market entrance become more onerous as the market distance and distinctiveness increases (Johanson & Vahlne, 1977). For this reason, we included a comprehensive measure of distance that captures the cultural, administrative, geographic, and economic (CAGE) distances between each country dyad (Ghemawat, 2001).

4. Results

Analysis of the results indicates strong support for all three hypotheses, with material effect sizes and a low probability of error. The descriptive statistics and bivariate correlations (Table 2) are consistent with the hypothesized relationships among the focal indicators. As expected, significant positive correlations are evident among affordable loss, new market entry and the use of compensatory real options. However, the focal predictors (CRO and ALL) were weakly, or even negatively correlated with firm revenues and experience, suggesting that smaller, newer firms, possessing more modest resources, are more inclined than are large, established firms to pursue riskier trade credit strategies. We inspected our data for outliers and other potentially problematic patterns, using box plots, residual plots, and other standard tools of exploratory data analysis. The variance inflation factors (VIF) were all well below the conventional standard of 10 (Neter et al., 1989), suggesting that multicollinearity was not a concern.

[Insert Table 2 about here]
Revenues for the participating firms ranged from $500,000 to $5 million, with an average of just under $1.6 million. Total experience ranged from 3 to 37 years, with an average of 13.8 years, while international experience ranged from 1 to 34 years, with an average of 6.9 years.

Regarding the critical relationship between a firm’s trade credit risk and the generation of CROs, Table 3 provides key data concerning the use of trade terms, ranging from high caution to high risk, as described in Table 1. As noted in our review of the internationalization literature, new and small ventures seeking to achieve international expansion confront a persistent threat of opportunism on the part of exchange partners. While extending credit heightens this risk of opportunism, our contention is that firms adopt an ALL approach as a calculated strategy to pursue growth opportunities in a stepping stone fashion. The data in Table 3 bear this out. 462 firms, representing 44% of the sample, participated in transactions that eventually created at least one CRO, and firms that opt for the most assertive “act and see” approach (i.e., Category 4) to opportunity exploration, generate more CROs.

[Insert Table 3 about here]

The data in Table 3 reveal strong support for the predictions of heterogeneous outcomes stemming from the combination of risky exploration and downside safeguards. Confirming the association proposed between leveraged uncertainty and CRO generation, Cat. 1 resulted in CROs for only 15% of the firms, an average of 0.26 CROs per firm. Conversely, under Cat. 4 conditions, the “high risk” terms, 88% of the firms generated CROs, an average of 6.77 CROs per firm, a rate that is 26 times higher than firms seeking to minimize affordable loss through the use of Cat. 1.

4.1 Sequential Decision-making and the Effort to Internationalize

Fundamental to “act and see” logics is the ability and willingness to conduct an exploratory campaign through what McGrath, et al. (2004) called “a series of ‘nested’ option like choices”.

Internationalization through Real Options Reasoning
McGrath and MacMillan (2000) referred to these sequential choices as “stepping stone” options, a phrase meant to convey that the value created by these options stemmed less from exercise choice and abandonment flexibility (Adner & Levinthal, 2004) than from a “sensemaking” function as an entrepreneur moved forward in exploratory fashion. In this respect, H1 suggests that CROs serve as a “stepping stone” function for internationalizing entrepreneurs. If true, then transactions that generate CROs create more value for a firm than transactions that do not generate CROs. As discussed earlier, CROs are primarily generated by firms that engage in high-risk trade terms (Table 3), which has the effect of heightening both the uncertainty of the transaction and the compensatory option value harvested by the exporting firm. Of the 87,941 transactions reported by the 1,040 firms, 2,642 of the transactions eventually led to NPMs. In the language of McGrath and MacMillan (2000), the CROs serve as entrepreneurial “stepping stones.”

In order to make the case that internationalizing entrepreneurs engage in sequential decision-making that leverages the option value of uncertainty, two things must be demonstrated: (i.) market-entry transactions and their outcomes are sequentially linked; (ii.) heterogeneous outcomes can be traced to specific business practices implemented by individual firms.

4.2 Internationalization

Through our research design, we sought to test for the sequential linkage of CRO generation to new market entry to internationalization (Table 4), which is elaborated below. Model estimates for the regression analysis reveal the extent to which firm-level strategic decisions regarding trade credit risks are linked to internationalization (TI). The six models are designed to assess the influence of CROs and ALL independently and conjointly. Hypothesis 1 predicted that TI would be positively related to the use of CROs. The regression results in Table 4 demonstrate that this hypothesis finds significant support. Model 2 indicates that over and above the base case
controls contained in Model 1, the generation of CROs contributes significant incremental explanatory power ($r^2 = .46$, $\Delta r^2 = .11$, $F_{1,1025}^* = 149.1$, $p < .001$), with a material effect. The number of CROs generated by a firm is highly predictive of $TI$ ($\beta_{CRO} = .63$, $p < .001$). Since $TI$ is a normalized indexed value, ranging from 0 to 1, that we mean-centered for our model analytics, the coefficient 0.63, means that, on average for our indexed scale, each additional CRO increases a firm’s $TI$ by 6.3% (i.e., $0.63 \times 0.10 = 0.063 = 6.3\%$). For the average Category 4 firm – which generated an average of 6.77 CROs – this has the effect of increasing $TI$ by 51.2% (i.e. $(1.063)^{6.77} - 1 = 0.512$). For the average firm in our sample, this has the effect of increasing $TI$ from .022 to 0.33, and increasing the firm’s international markets from one to four.

[Insert Table 4 about here]

In similar fashion, Hypothesis 2 examined the relationship between the level of affordable loss and $TI$, modeled independently from CROs. The use of ALL, captured in Model 3, explains a material amount of the variance in internationalization, ($r^2 = .38$, $\Delta r^2 = .03$, $F_{1,1027}^* = 137.5$, $p < .001$). ALL has a statistically material effect ($\beta_{ALL} = .71$, $p < .001$) over and above the baseline set of controls, such that firms pursuing higher-risk, Category 4 terms of trade have a 71% higher $TI$ than the average for firms pursuing either prepayment (Cat. 1) or insured payment (Cat. 2 and Cat. 3) strategies. Thus, Hypothesis 2 finds support.

4.3 Combined Effect of Real Options Reasoning and Affordable Loss Logics

Model 5 presents a single d.f. test of Hypothesis 3, which predicted that the combined effect of CRO and ALL, indicated by the product term, would exhibit greater explanatory power than neither (Model 1), either (Models 2 and 3), or both (Model 4), when excluding the interaction of CRO*ALL. In the context of a complete set of controls and predictors, Model 5 displays significantly greater explanatory power than the four alternative models. Over and above the
independent effects of CRO and ALL, the combined effect of CRO*ALL is significant (β_{CRO*ALL} = .41, p < .001). Moreover, Model 5 offers significantly greater explanatory power (r² = .54, Δr² = .19, F*_{1,1025} = 161.0, p < .001), in support of Hypothesis 3.

Notably, in the complete model, ALL no longer has a statistically significant coefficient (p = 0.080), while CRO does (p < 0.001). Although this non-significant coefficient does not provide conclusive evidence for the absence of an effect (Hahn & Ang, 2017), it is consistent with our assertion that ALL serves as a supporting mechanism for internationalization but is not primarily value-creating in and of itself, when assessed in the context of a complete set of predictors. Meanwhile, CRO generation has value over and above the presence of both ALL and the multiplicative relationship between CRO*ALL. The significance of the CRO*ALL interaction is illustrated in Figure 4. High levels of CROs combined with ALL result in far greater new market entry. This suggests that when CROs and ALL function jointly, entrepreneurs are able to capitalize on the option value of leveraged uncertainty by initiating riskier projects, but abandoning them early enough to allow for the reallocation of search and discovery resources.

[Insert Figure 4 about here]

4.4 Robustness Tests

Models such as the ones developed for this analysis are potentially at risk of endogeneity on two fronts: reverse causality and omitted variables. In particular, firm-level factors could be responsible for choices related to trade credit, export partner selection, opportunism mitigation, and internationalization, choices which are not random. The non-randomness of these decision-choice variables potentially exposes our analytical model to the biasing effects of endogeneity (Semadeni, Withers & Certo, 2014). In response, we evaluated the robustness of our results using two different procedures. First, we performed Heckman’s (1979) two-step procedure. Following Leiblein and Miller (2003), in the first stage, we ran a bivariate probit model, in which dummy-
coded variables for each of the trade credit strategies (Table 1) were set as the dependent variables, and then regressed over the control variables. The inverse Mills ratios — indicating self-selection to specific trade-credit strategies — were then included in the stage-two regression to test for significance with a complete profile of controls and predictors. The results from the stage-two analysis revealed that the inverse Mills ratios were not significant, thereby attenuating concern that our models may be subject to biasing effects.

Second, for endogeneity concerns related to variables that are potentially missing from our model, we conducted the Hausman specification test (Davidson & MacKinnon, 1992) using instrumental variables (IV) as correlated with the focal predictor, but not the error term (Angrist, Imbens, and Rubin, 1993). We tested two instruments. The first IV we have identified is the difference in the home market and international market population growth rates among children aged five to fifteen. This IV is theoretically and methodologically relevant to our inquiry because international commodity trade is highly related to the socio-economic causes of population fluctuations (Sargan, 1958). Also, this age group is a forward-looking indicator of both labor availability and the future demand for commodities. The second instrument consisted of the difference in firm founding rates between each firm's home market and aspirant international market, using data from the Global Entrepreneurship Monitor (GEM, 2018). Firm founding rates are a compelling proxy for formal and informal institutional environments and the extent to which business activity by small and new firms is encouraged or discouraged (Veciana & Urbano, 2008).

Using SPSS, we found that the instruments are jointly significant predictors of $TI (F_{4,1036} = 25.71, p \leq .01)$, thereby indicating satisfactory IV strength. Next, we performed Hansen’s (1982) J test and were unable to reject the null hypothesis that the instruments are exogenous ($p = .41$), thereby satisfying of the exclusion restriction, which supports efficacy of our instruments (Bascle,
Finally, we ran the Hausman test, showing we could not reject the null hypothesis regarding the exogeneity of export strategy ($\chi^2 = 7.29, p > .1$), meaning that the model coefficients are not materially subject to the biasing effects of endogeneity.

5. Discussion

Frank Knight asserted in his foundational work that uncertainty is a fact of life (1921). No matter how great the competence one attains, no matter how voluminous the data to which one has access, important facets of human enterprise inherently involve “plunging into the unknown” (Keynes, 2006). Common sense and a considerable amount of prior research would seem, therefore, to demonstrate that risk and uncertainty are no friends of small, resource-constrained firms; and yet, the results of our investigation suggest significant value can be created by internationalizing entrepreneurs who seek to monetize the asymmetric differences between risk and uncertainty through the combined use of ROR and ALL. The findings support the notion that “uncertainty is a fertile ground for creativity and imagination” (Shackle 1966:764; Saleh & Hunt, 2020), particularly when the means to resolve the uncertainty is endogenous to the entrepreneur’s decision-making context (McGrath et al., 2004). Under these circumstances, options reasoning with an affordable loss safety net to limit downside risks conjointly serve as a rational basis to embrace uncertainty. Contrary to the conventional notions of risk reducing behavior, the stepping stone investments manifested in the “act and see” approach actually increase the uncertainty faced by an entrepreneur, but a significant compensatory offset comes in the form of choices and future opportunities that would not otherwise arise. In this sense, our proposed theory solves both the question of why entrepreneurs seek to monetize uncertainty through international market entry (Hunt & Song, 2015; Yan et al., 2020) and the question of how they accomplish that aim.
5.1 Contributions to Research

This study makes several key contributions. First, results of this study provide empirical validation of the challenges and rewards of balancing the asymmetric tensions between the downside risks associated with opportunism in international market entry (Ciravegna, Majano & Zhan, 2014; Verbeke & Ciravegna, 2018; Verbeke et al., 2019) with the possibility of creating new future opportunities through entrepreneurial action (Townsend et al., 2018; Van Lent et al., 2020). Our study responds to the call for more empirical research on opportunism in international transactions (Luo & Tung, 2007), especially in the context of SMEs (Verbeke & Ciravegna, 2018). Prior research has shown how large organizations can use different governance mechanisms, such as FDI, to reduce opportunistic behaviors of their foreign partners (Buckley & Casson, 1976; Hennart, 1982; Hill, 1990; Zhou & Xu, 2012), but much less is known about how resource-constrained SMEs can effectively manage the challenge of opportunism while growing internationally (Verbeke & Ciravegna, 2018). Our study addresses this gap by identifying the joint use of ROR and ALL as a novel mechanism that helps SMEs to thwart opportunism.

We also contribute the literature on international entrepreneurship by explaining SMEs’ internationalization performance using ROR. While it has long been known that entrepreneurs are motivated to actively pursue international opportunities (Oviatt & McDougall, 2005), the question of why and how they do so in the context of irreducible uncertainty has passed conspicuously untested. Embracing entrepreneurship, noted Venkataraman (1997), “implies accepting all that goes with it, particularly the recognition of a priori irreducible uncertainty.” We show that entrepreneurs who embrace these uncertainties are compensated with more options. By having more options to choose from, entrepreneurs are more likely to pursue high quality international market opportunities and generate more revenue from each new entry.
Lastly, by bridging ROR and ALL, we extend the applicability of ROR, which has to date been stymied by several problems (Chi et al., 2019). First, some scholars argue that there is little evidence that most firms – especially young, small, entrepreneurial ventures – possess either the relevant information about future opportunities or the computational skill to actually perform real options valuation (Klingebiel & Adner 2014; Miller & Shapira, 2004). Second, even if such capabilities existed among small ventures, these entrepreneurs may discover that ROR provides an “overly seductive” post hoc rationalization for action taken in the context of uncertainty (Adner & Levinthal, 2004), resulting in the escalation of expensive resource commitments that are often difficult to abandon (Barnett, 2003; Coff & Laverty, 2001). Third, empirical evidence regarding the use of ROR in international entrepreneurship remains sparse (Dew, Sarasvathy, Read, & Wiltbank, 2009; Chi et al., 2019) as prior research focuses on large-scale, well-resourced, multi-national corporations (Reuer & Leiblein, 2000; Tong, et al., 2008).

The applicability of ROR is most poignantly demonstrated when paired ALL. As we graphically depicted in Figure 2, the introduction of ALL unlocks the potential applicability of ROR in several respects. First, in contrast to the strong computational skill required by real options valuation (Klingebiel & Adner 2014; Miller & Shapira, 2004), ALL, as a key principle from the decision theoretic work of Shackle (1966) that has been used in complementary approaches in effectuation theory (Sarasvathy, 2009), is information-light and computationally simple (Dew et al, 2009). ALL is relevant to ROR: the former emphasizes controlling losses (Shackle, 1966), and the later emphasizes predicting returns (Adner & Levinthal, 2004). Second, ALL helps to establish a clear abandonment criterion: entrepreneurs will continue to take the plunge and pursue new market entries when the losses are affordable, and they will stop doing so when the losses are unaffordable. Third, ALL illuminates how SMEs can use ROR to enter new international markets.
Although SMEs may not have the resources to make initial investments in the form of alliances or acquisitions (Reuer & Leiblein, 2000; Tong et al., 2008), they can make their initial investments in the form of extending credit, i.e., affording more losses.

Our framework extends the notion that ROR serves as a strategic decision-making heuristic (Jahanshahi et al., 2015; McGrath, Ferrier, & Mendelow, 2004; Posen et al., 2017), but it also addresses the valid concerns of ROR skeptics who have cautioned that ROR resource allocation schemas are perilous when they lack organizational and managerial discipline (Adner & Levinthal, 2004; Barnett, 2003). In extending the former and placating the latter, we conjoin ROR and ALL to demonstrate why and how internationalizing entrepreneurs create new market opportunities without succumbing to the potentially adverse “seductiveness” of ROR.

By coming at this issue differently through the lens of new market entry by internationalizing entrepreneurs, and by providing the first transaction-level assessment of real options reasoning, we advance the notion that ROR is a robust mechanism to describe and predict exploratory action when it is paired with affordable loss logics (ALL), thereby balancing both flexibility and safeguards. It is particularly important to understand the use of options reasoning in confronting endogenous versus exogenous uncertainty. As the results of our study demonstrate, when the capacity to resolve a priori irreducible uncertainty is endogenous to the decision-making frame of the internationalizing entrepreneur (Figure 2), then an “act and see” approach will be highly apropos. On the whole, however, our large-breadth conception of ROR constitutes a notable advance over existing attempts to explain and predict exploratory activity, which do not take into account the important asymmetries between downside risks and uncertain opportunities.

In this sense, our approach differs from related work at the intersection of effectuation theory and internationalization strategies (Karami et al., 2019) based on the degree of goal and
product ambiguity in scope conditions of these complementary theories to entrepreneurial action under conditions of uncertainty (Townsend et al., 2018). As Figure 2 illustrates, in situations where the nature of the product is entirely ambiguous (i.e., the so-called “suicide quadrant” with high levels of technological and demand ambiguity – Sarasvathy, 2009), the mechanisms outlined in effectuation theory are important means through which ambiguity can be resolved (Townsend et al., 2018). By elucidating this dynamic, our theoretical framework offers a fruitful middle ground on the issue of ROR’s applicability and suitability (see Figure 2). The results suggest that the real options debate is best resolved through the conjoint use of ROR and ALL.

5.2 Limitations

As is the case with all research designs, this one has its limitations that open up opportunities for future research. Two areas of potential concern were discussed earlier: one was the selection of the lumber industry and the other was the use of firms with revenues between $500,000 and $5 million. Both decisions were made to ensure that the focal effects would pertain to small firms with a reliable degree of control, and to reinforce boundary conditions around other related theories which might be leveraged to address some of these questions. However, future opportunities abound to expand, extend, challenge, and refine the findings derived from this study by employing data from a broader cross section of firms and industries. There are also considerations associated with the use of retrospective analysis. Several steps were taken to mitigate the potential biases stemming from this design choice. First and foremost, the data that were used afforded the ability to validate the survey findings through the use of third-party proprietary data sources used by the lumber industry on a global basis. Additionally, the nature of the survey questions did not require retrospective judgments, opinions or sentiments on the part of respondents. Consistent with methodological norms for in situ examinations of entrepreneurial
strategy (Ireland, et al. 2003) and in cases for which data are not publicly available, the use of retrospective data was suitable because it involved low frequency events involving prominent milestones (Golden, 1992). Lastly, since our data was collected for the period ranging from 1983 to 2017, it would be interesting for future research to examine how the introduction of new rules and regulations in recent years, as well as improvements in communication technologies and payment infrastructure, may have changed the default risk in export activities, and whether the effectiveness of ROR and ALL strategies has been affected by these institutional factors.

5.3 Conclusion

By opening a novel portal to new market entry through a detailed, transaction-level analysis, this study brings to light the compensatory function of ROR and the portfolio optimizing function of ALL as conjoined mechanisms that are employed to conduct pioneering search in a value-added, yet decidedly risk-bound fashion. As the foregoing results demonstrate, heterogeneity in new market entry is closely related to an entrepreneur’s willingness and ability to pursue strategies that generate opportunities from irreducible uncertainty while managing downside risks. Building upon existing conceptions of real options reasoning, this study offers answers to both why and how internationalizing entrepreneurs may rationally embrace uncertainty in pursuit of new value creating opportunities.

REFERENCES


FIGURE 1: Extant Assumptions Regarding the Boundaries of Applicability for Real Options

Target Market

Fixed

Flexible

Fixed

Real Options

Flexible

Path Dependent Investments

(from Adner & Levinthal, 2004)

FIGURE 2: Reconceptualized Boundaries - Taking into Account Concurrent Use of ROR+ALL.

Locus of Uncertainty

Exogenous

Endogenous

Low

“Classical” Real Options (“wait and see”)

Degree of Uncertainty

High

Real Options Reasoning + Affordable Loss Logics (“act and see”)

Effectuation, and Other Modes in the Context of Goal Ambiguity
**FIGURE 3: Illustrative Example of Cascading Effects**

*Transaction α (T₀)*

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<th>Transaction</th>
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<td>Pride Design (Russia)</td>
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</tr>
</tbody>
</table>

*CRO = real options for all of the opportunities that a firm has created; NPM = new market opportunities in new countries that are actually exploited; The dotted line represents unexploited opportunities.*

**FIGURE 4: Interaction Effects of ROR and ALL on Internationalization**

<table>
<thead>
<tr>
<th>Total Forward Internationalization (TFI)</th>
<th>Low ROR</th>
<th>High ROR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low ALL</td>
<td>0.12</td>
<td>0.23</td>
</tr>
<tr>
<td>High ALL</td>
<td>0.27</td>
<td>0.65</td>
</tr>
</tbody>
</table>
TABLE 1: Taxonomy of Affordable Loss through Export Trade Terms

<table>
<thead>
<tr>
<th>Exporter Approach</th>
<th>Key Characteristics</th>
<th>Affordable Loss</th>
<th>Potential Impairment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. High Caution</td>
<td>• Full payment in advance</td>
<td>None</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>• Risk falls solely on the buyer</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• No credit terms</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Disqualifies all but the most liquid importers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Moderate Caution</td>
<td>• Proof of available funds (e.g. letter of credit)</td>
<td>Small</td>
<td>&lt; 10%</td>
</tr>
<tr>
<td></td>
<td>• Payment on shipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Risk falls primarily on buyer</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Strenuous proof of creditworthiness</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Disqualifies most small importing firms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Moderate Risk</td>
<td>• Proof of payment (e.g. documentary collection, bill of exchange, or sight draft)</td>
<td>Moderate</td>
<td>&lt; 30%</td>
</tr>
<tr>
<td></td>
<td>• Payment on arrival of goods</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Risk shared by buyer and seller</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Moderately strenuous proof of creditworthiness</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Disqualifies many small importing firms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. High Risk</td>
<td>• Extended Credit Terms - including use “Open Account”</td>
<td>Very High</td>
<td>Up to 100%</td>
</tr>
<tr>
<td></td>
<td>• Payment at a specified future date or even on consignment</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Risk falls solely on seller</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Significant risk of delinquencies or non-collection</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Numerous potential importing partners</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2: Descriptive Statistics and Pairwise Correlations

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Forward Internationalization</td>
<td>0.22</td>
<td>0.34</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compensatory Real Options</td>
<td>2.54</td>
<td>4.48</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Affordable Loss Logics</td>
<td>2.61</td>
<td>0.93</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Firm Size</td>
<td>8.33</td>
<td>2.54</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm Age</td>
<td>13.8</td>
<td>7.07</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Firm Intl. Experience</td>
<td>6.87</td>
<td>5.14</td>
<td></td>
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</tr>
<tr>
<td>Revenue - Total</td>
<td>1,576,850</td>
<td>889,406</td>
<td></td>
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<tr>
<td>Revenue - International</td>
<td>1,146,880</td>
<td>1,012,400</td>
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<td></td>
</tr>
<tr>
<td>Home Avg GDP Gr Rate</td>
<td>0.01</td>
<td>0.07</td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partner Avg GDP Gr Rate</td>
<td>0.01</td>
<td>0.09</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAGE Distance</td>
<td>0.05</td>
<td>0.93</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>Home Avg Industry Gr Rate</td>
<td>0.03</td>
<td>0.11</td>
<td></td>
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<td></td>
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<tr>
<td>Partner Avg Industry Gr Rate</td>
<td>0.03</td>
<td>0.16</td>
<td></td>
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</tbody>
</table>

Table 3: Trade Terms and the Frequency of Compensatory Real Options

<table>
<thead>
<tr>
<th>Trade Terms Mechanism</th>
<th>Mode</th>
<th>Firms in Category</th>
<th>Firms Creating CROs</th>
<th>% of Firms Creating CROs</th>
<th>Average CROs Created Per Firm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>High Caution</td>
<td>111</td>
<td>17</td>
<td>15%</td>
<td>0.60</td>
</tr>
<tr>
<td>2</td>
<td>Moderate Caution</td>
<td>403</td>
<td>98</td>
<td>24%</td>
<td>0.81</td>
</tr>
<tr>
<td>3</td>
<td>Moderate Risk</td>
<td>308</td>
<td>157</td>
<td>51%</td>
<td>2.63</td>
</tr>
<tr>
<td>4</td>
<td>High Risk</td>
<td>218</td>
<td>190</td>
<td>88%</td>
<td>6.77</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>1040</td>
<td>462</td>
<td>44%</td>
<td>2.25</td>
</tr>
<tr>
<td>Independent Variables</td>
<td>Model 1</td>
<td>Model 2</td>
<td>Model 3</td>
<td>Model 4</td>
<td>Model 5</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>------------------</td>
<td>------------------</td>
<td>------------------</td>
<td>------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>H1: Compensatory Real Options (# of CROs)</td>
<td>0.63 (0.19)</td>
<td>0.000</td>
<td>0.53 (0.22)</td>
<td>0.28 (0.09)</td>
<td>0.32 (0.13)</td>
</tr>
<tr>
<td>H2: Affordable Loss Logics (ALL)</td>
<td>0.000</td>
<td>0.71 (0.28)</td>
<td>0.60 (0.19)</td>
<td>0.22 (.07)</td>
<td>0.28 (0.11)</td>
</tr>
<tr>
<td>H3: ALL * CRO</td>
<td>0.000</td>
<td>0.000</td>
<td>0.007</td>
<td>0.080</td>
<td>0.036</td>
</tr>
<tr>
<td>Firm Size (Employees)</td>
<td>-0.31 (0.14)</td>
<td>-0.19 (0.09)</td>
<td>-0.25 (0.15)</td>
<td>-0.11 (0.05)</td>
<td>-0.10 (0.05)</td>
</tr>
<tr>
<td>Firm Age (yrs)</td>
<td>0.000</td>
<td>0.008</td>
<td>0.006</td>
<td>0.042</td>
<td>0.037</td>
</tr>
<tr>
<td>Firm Intl. Oper. Experience (yrs)</td>
<td>0.081</td>
<td>0.125</td>
<td>0.128</td>
<td>0.139</td>
<td>0.132</td>
</tr>
<tr>
<td>Firm Revenue - Total</td>
<td>0.18 (0.07)</td>
<td>0.08 (0.02)</td>
<td>0.05 (0.02)</td>
<td>0.05 (0.02)</td>
<td>0.05 (0.02)</td>
</tr>
<tr>
<td>Firm Revenue - International</td>
<td>0.093</td>
<td>0.117</td>
<td>0.120</td>
<td>0.122</td>
<td>0.128</td>
</tr>
<tr>
<td>Home Country GDP Growth Rate</td>
<td>-0.06 (0.03)</td>
<td>-0.06 (0.03)</td>
<td>-0.06 (0.04)</td>
<td>-0.06 (0.03)</td>
<td>-0.05 (0.02)</td>
</tr>
<tr>
<td>Partner Country GDP Growth Rate</td>
<td>0.130</td>
<td>0.130</td>
<td>0.141</td>
<td>0.148</td>
<td>0.156</td>
</tr>
<tr>
<td>Home Country Industry Growth Rate</td>
<td>-0.11 (0.07)</td>
<td>-0.09 (0.04)</td>
<td>-0.11 (0.06)</td>
<td>-0.09 (0.05)</td>
<td>-0.09 (0.03)</td>
</tr>
<tr>
<td>Partner Country Industry Growth Rate</td>
<td>0.11 (0.06)</td>
<td>0.10 (0.03)</td>
<td>0.11 (0.06)</td>
<td>0.10 (0.04)</td>
<td>0.10 (0.04)</td>
</tr>
<tr>
<td>CAGE Distance</td>
<td>-0.22 (0.09)</td>
<td>-0.18 (0.08)</td>
<td>-0.13 (0.09)</td>
<td>-0.12 (0.06)</td>
<td>-0.11 (0.06)</td>
</tr>
<tr>
<td>Year Effects</td>
<td>0.12 (0.03)</td>
<td>0.09 (0.02)</td>
<td>0.10 (0.04)</td>
<td>0.08 (0.02)</td>
<td>0.08 (0.02)</td>
</tr>
<tr>
<td>(Constant)</td>
<td>0.34 (0.10)</td>
<td>0.44 (0.19)</td>
<td>0.58 (0.25)</td>
<td>0.38 (0.14)</td>
<td>0.23 (0.08)</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.35</td>
<td>0.46</td>
<td>0.38</td>
<td>0.50</td>
<td>0.55</td>
</tr>
<tr>
<td>$R^2$ (vs. Controls only)</td>
<td>-*</td>
<td>0.11</td>
<td>0.03</td>
<td>0.15</td>
<td>0.20</td>
</tr>
<tr>
<td>$F$-Value - Full Model</td>
<td>128.7</td>
<td>149.1</td>
<td>137.5</td>
<td>154.2</td>
<td>163.8</td>
</tr>
<tr>
<td>Sample Size (# of transactions)</td>
<td>87941</td>
<td>87941</td>
<td>87941</td>
<td>87941</td>
<td>87941</td>
</tr>
</tbody>
</table>

Note: Robust standard errors are reported in parentheses and p values are reported in italics.