A SIGNALING ACCOUNT OF VOLUNTARY VALUE-ADDED TAX REGISTRATION

*Emily A. Satterthwaite**

Abstract. The notion that firms' tax status choices can convey valuable private
information in real-world marketplaces has broad appeal. However, well-developed
accounts of how tax status might function in such a manner are scarce. Building on
recent survey evidence suggesting that small-firm entrepreneurs may view voluntary
value-added tax ("VAT") registration as a way to secure reputational advantages, this
paper applies the costly signaling model of Spence (1973) to propose and interrogate
an informational account of firm tax status choices in the context of a VAT. Like the
use of education by a job-seeker to convey private information about her productivity
to potential employers, might voluntary VAT registration by a small-firm entrepreneur
by viewed by potential trading partners as a signal of quality? Under the standard
"formality chain effect" model of voluntary registration, the immediate answer would
appear to be no: a small firm that trades with formal VAT-registered counterparties
will *profit* (not incur costs) from registering voluntarily. VAT economists often rely on
this insight to recommend that lawmakers allow presumptively-exempt small firms to
register voluntarily.

      This paper's thesis is that, contrary to first impressions, the formality chain
effect model and a signaling account are consistent and mutually reinforcing. It argues
that small firms that are not embedded in formal supply chains aspire to look big, or at
least like those which are fully embedded. Pursuing these aspirations through
voluntary registration entails a set of costs that may vary inversely with several
important indicators of firm quality. First, a firm's propensity to register voluntarily
may correlate with the entrepreneur's business sophistication or prior business
experience. Second, lower costs of voluntary registration may correlate with an
entrepreneur's intrinsic commitment to legal compliance and thus her reliability as a
counterparty. Third, the opportunity cost of registering voluntarily will be lower for

rapidly-growing firms. The paper concludes by considering the policy implications of
a signaling account of voluntary registration.

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Introduction

"Register for taxes that are not legally required" seems an unlikely entry on the to-do list of a fledgling businessperson or emerging entrepreneur.[1] Might a small business entrepreneur voluntarily register for and pay an "optional tax" as a way of conveying information to her counterparties about the quality of her product or service, or the legitimacy of her business?[2] The notion that choices

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[1] Recent research on structural barriers to incentivizing innovation has focused on the reverse phenomenon: new firms often decline to pursue *tax-minimizing* planning strategies even if such planning has positive expected net present value to the firm. See Susan Morse and Eric Allen, Innovation and Taxation at Start-Up Firms, 69:3 Tax L. Rev. 357, 383 (2016) (proposing that, under assumptions consistent with empirical data, "a capital-constrained firm such as a start-up does not think about investing in tax planning as a project of identifying all tax planning investments with positive net present value. Rather, because such a firm must operate with a limited endowment, it trades off the likely benefits of a possible investment in tax planning against the disadvantage of having less to spend on business investment").

[2] The context in which small firms respond to an explicit (and very clear) choice in the law about "joining" a tax system is distinguishable from that facing larger, more disruptive firms considering whether to affirmatively embrace tax reporting as part of a larger public relations and regulatory compliance strategy. See, e.g., Shu-Yi Oei and Diane M. Ring, The Tax Lives of Uber Drivers: Evidence from Internet Discussion Forums, 8 Colum. J. Tax L. 56, 65 (2017) (noting with respect to the voluntary shift into more stringent

relating to tax can play an informational role in real-world settings has gained broad appeal.[3] The literature specific to tax signaling includes analysis of voluntary income tax compliance norms as signals and an account of corporations' domiciles as signals in which Delaware's franchise tax structure plays a key role.[4] However, aside from a few suggestions that signaling may explain perplexing choice-of-entity patterns among startups, well-developed analysis of how a firm's tax status *itself* might emerge as a signal is scarce.[5] This paper undertakes such an analysis with respect to a tax status with global relevance: small-firm value-added tax ("VAT") registration.[6]

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information reporting among ride-sharing firms that "Lyft has taken the position that it is a 'third party settlement organization' only required to report payments above the $200,000/200 transactions threshold. Uber took this position until early 2015, but then began issuing Form 1099-K to drivers for all driving payments, no matter how small").

[3] See, e.g., Andrew T. Hayashi, Rules and Standards: The Games Lawmakers Play, draft dated March 10, 2019 (available at http://www.law.northwestern.edu/research-faculty/colloquium/law-economics/documents/spring19hayashi.pdf); Andrew T. Hayashi, A Theory of Facts and Circumstances, 69 Ala. L. Rev. 289 (2017); Leigh Osofsky, Who's Naughty and Who's Nice: Frictions, Screening, and Tax Law Design, 61 Buff. L. Rev. 1057 (2013); Alex Raskolnikov, Revealing Choices: Using Taxpayer Choice to Target Tax Enforcement, 109 Colum. L. Rev. 689 (2009). For applications in other legal settings, see, e.g., William H.J. Hubbard, Costly Signaling, Pleading and Settlement, Coase-Sandor Institute for Law and Economics Working Paper (April 2017); Oren Bar-Gill and Omri Ben-Shahar, An information theory of willful breach, 107 Mich. L. Rev. 479 (2008); Albert Choi and George Triantis, Completing contracts in the shadow of costly verification, 37(2) Journal of Legal Studies 503 (2008); Matthew C. Stephenson, A Costly Signaling Theory of Hard Look Theory, Harvard Law School John M. Olin Center for Law, Economics and Business Discussion Paper Series, Paper 539 (2006); A. Mitchell Polinsky and S. Shavell, Punitive damages: An economic analysis, 111 Harv. L. Rev. 869 (1997).

[4] See Eric A. Posner, Law and Social Norms: The Case of Tax Compliance, 86 Virginia Law Review 1781, 1787 (2000) (providing a theory of social norms regarding tax compliance in different communities as the result of signaling equilibriums in which actors have private information about their discount rates); Edward M. Iacobucci, Toward a Signaling Explanation for the Private Choice of Corporate Law, 6 Am. Law and Econ Rev. 319 (2004) (providing a signaling account of Delaware corporate domicile, comparing and contrasting with agency theories).

[5] See Eric J. Allen, Jeffrey C. Allen, Sharat Raghavan & David H. Solomon, On the Tax Efficiency of Startup Firms, working paper dated Aug. 30, 2018, at 28-29, 33 and 39 (questioning "rational cost-based explanations" of the prevalence of the C corporation organizational form among startups but finding that "direct costs [such as legal costs of redrafting LLC membership agreement for each new investor] may disproportionately influence financially constrained founders, as they must be borne upfront" and finding further that indirect "non-tax hassle costs of the LLC form…can partly explain the choice of organizational structure," both of which are consistent with use of an LLC as a signal of founder resources or sophistication); Emily A. Satterthwaite, Entrepreneurs' Legal Status Choices and the C Corporation Penalty, 16:3 J of Empirical Legal Studies 542, 582-3 (2019) (hinting at signaling with respect to the finding that S corporation start-ups survive longer as compared to (likely) S-eligible C corporation start-ups; noting that this "offers circumstantial evidence that one channel through which entrepreneurs encounter a 'mismatch' in choosing C corporation status may be the hurdle of having to elect out of the default Subchapter C status and in to Subchapter S corporation status").

[6] See Kathryn James, The Rise of the Value-Added Tax (New York: Cambridge University Press, 2015), at 1-3.

By way of background, it is common for VAT statutes around the world to exempt small firms from the requirement to register for and collect VAT on their sales to customers.[7] The exemption for small firms is typically is paired with an election to register voluntarily.[8] This mechanism raises the possibility that an entrepreneur might choose to VAT-register her small business for the sole purpose of conveying private information about her firm.[9] To assesses from a theoretical perspective the merits of this possibility, this paper applies the intuition of Michael Spence's (1973) education-productivity signaling model to the case of small-firm voluntary VAT registration.[10]

The paragraphs above likely gave rise to several important questions for many readers. First, regarding the signaling account: where did it come from? Is there evidence that small-firm entrepreneurs think about voluntary VAT registration as conveying information in their marketplaces? Second, why would a revenue-attentive government want to offer a VAT "option" to small firms, and under what circumstances (if any) might an entrepreneur exercise it? Finally, even if voluntary VAT registration could function as a signal, what policy significance might it have?

Answering these questions is central to the paper's task of developing and interrogating a signaling account of voluntary VAT registration. Thus, Part I starts with the motivation for the signaling inquiry: it summarizes the findings of recent empirical research on the voluntary registration decisions of small-firm entrepreneurs. Part II provides background on the formality chain effect model and explains how voluntary registration can be advantageous to small firms under certain circumstances. Part III turns to the signaling account by describing the requirements and implications of Spence's signaling model. Part IV investigates how a small-firm entrepreneur's choice to voluntarily register might (or might not) mesh with a signaling account. In particular, it argues that foregrounding the practical problem of compliance costs can help resolve the apparent inconsistency between the VAT literature's standard account of voluntary registration and this paper's signaling account, and that the two are mutually reinforcing. Part V concludes by offering several conjectures on the policy implications of signaling.

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[7] See Sharon Smulders and Chris Evans, Mitigating VAT compliance costs – a developing country perspective, 32 Australian Tax Forum 283, 293-94 (noting that "[o]f the 34 OECD countries with a VAT, 28 have set a threshold under which small businesses do not register for the tax").

[8] Id. at 295 ("while not being in the VAT regime might sound attractive, the choice is not always obvious, as there can be benefits of VAT registration…virtually all countries with thresholds allow small businesses to register for the VAT if they so choose"). See also Ian Crawford, Michael Keen and Stephen Smith, Value Added Tax and Excises, Mirrlees Report (2010), at 299.

[9] See Pierre-Pascal Gendron, Real VATs vs. the Good VAT: Reflections From a Decade of Technical Assistance, 32 Australian Tax Forum 257, 268 (2017) (discussed infra).

[10] See Michael Spence, Job Market Signaling, 87 Quarterly Journal of Economics 355 (1973) (modeling education acquisition by future job-seekers; assuming that "individuals…select signals (for the most part, I shall talk in terms of education) so as to maximize the difference between offered wages and signaling costs").

Part I. Motivation: why signaling?

At present, no empirical studies have set out to test the hypothesis that small-firm entrepreneurs use VAT registration as an informational cue.[11] However, hints that voluntary VAT registration may play a signaling role have surfaced in two recent survey-based studies of small business VAT compliance. Another has appeared in the writing of a leading VAT economist.

In the first study, researchers commissioned by the United Kingdom's tax authority surveyed over two thousand firms to learn about their VAT registration and compliance experiences.[12] Among the firms that had voluntarily registered for VAT, approximately twenty percent identified "[i]mproved reputation/credibility/image" as one of the "benefits of registering."[13] The report also noted that, according to follow-up qualitative surveys of some of the participants, "VAT registration was said to make a company look larger, more established and more stable."[14] The report did not make any claims about the statistical significance of this "improved reputation" factor, nor did it shed light on whether the factor was decisive in participants' decision-making about voluntary registration. Nonetheless, it suggests that voluntary VAT registration may play an informational role for some UK small firm entrepreneurs.

In the second empirical study, which occurred simultaneously but without knowledge of the UK study, this author conducted a survey of ninety-eight small business entrepreneurs in Ontario, Canada. Eligibility for the study was restricted to firms that qualified in one of the three most recent years as a "small supplier" pursuant to the definition in the Canadian federal VAT statute (the "Goods and Services Tax," or GST), which roughly corresponds to having less than $30,000 in sales during any rolling four-quarter period.[15] Survey participants answered a series of quantitative and qualitative questions about their businesses and their views about voluntarily registering; these yielded a number of unprompted responses that echoed those from the UK study.[16] For example, one unregistered

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[11] The two surveys discussed herein were not designed to shed light on this specific hypothesis.

[12] See Rebecca Klahr, Lucy Joyce, Rory Donaldson, Graham Keilloh, and Cheryl Salmon, Behaviours and experiences in relation to VAT registration: final report, HM Revenue and Customs Research Report Number: 446 (Ipsos MORI Social Research Institute: November 2017), at 7, 21-29 (surveying 604 unregistered businesses, 761 voluntarily-registered businesses, and 644 mandatorily-registered businesses; noting that unregistered businesses were "[b]usinesses that are not registered for VAT and whose turnover was up to £7,000 below the VAT threshold in 2012/13 and 2013/14 (referred to throughout as 'unregistered borderline businesses')).

[13] Id. at 28. The study also reported, with respect to all registered businesses (those who registered voluntarily and those who registered because it was required), that "while fewer than one in five VAT registered businesses spontaneously mentioned benefits to their image and reputation, around seven in ten when prompted agreed that being registered has improved their business image." Id. at 29.

[14] Id. at 22.

[15] See Excise Tax Act, RSC 1985, c. E-15, as amended (hereinafter "GST") and GST Amending Act 1993, c. 27, s. 23; 1997, c. 10, s. 148 (defining "small supplier").

[16] See Emily Satterthwaite, "Electing into a Value-Added Tax: Survey Evidence from Ontario Microentrepreneurs," 66:4 Canadian Tax Journal 761, 801 (2018) (reporting that "[t]his factor was mentioned by six participants, or 6 percent of the full sample (5 percent of all registered participants; 7 percent of all unregistered participants)").

participant stated that she had considered registering her enterprise voluntarily "to make it seem like a more official business."[17] This was similar to the response of a voluntarily-registered participant, who explained, "I wanted to look more official."[18] Another unregistered participant shared her desire to voluntarily register in the future, and stated that registering would make her business look "more professional, and is the way things should be."[19] A second voluntarily-registered participant declared that he decided to register because it "shows you are a legitimate business."[20] Others had similar responses.[21]

In addition to the two surveys, a recent academic article by economist Pierre-Pascal Gendron reflected on lessons learned from his VAT technical assistance work in numerous developing countries over the past decade. Gendron notes, as part of his discussion of small business VAT compliance issues, that "a supplier that is VAT-registered may signal to clients that it runs a legitimate and reputable business."[22] He does not elaborate further on this idea in the article, but the statement suggests that his direct experience assisting governments in their adoption of VATs corresponds, at least to some degree, to the signaling notion.

These are, indeed, just hints. However, taking these reports and on-the-ground experiences seriously invites an inquiry into how exactly a signaling account would work in the context of a VAT. To do this, the next section provides the necessary background on VAT mechanics.

Part II. Background: what is voluntary registration and why offer it?

Readers who are already familiar with the basic mechanics of an input-credit VAT should skip to the next Part.

First, some nomenclature. The above-noted $30,000 figure that appears in Canada's GST statute is known more generally as a "registration threshold," and the overwhelming majority of VAT statutes have one.[23] Registration thresholds determine which firms (usually, those with annual taxable supplies/sales less than a given threshold[24]) qualify as presumptively-exempt "small

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[17] Id. (Survey Participant #1001).

[18] Id. (Survey Participant #1005).

[19] Id. (Survey Participant #1022).

[20] Id. (Survey Participant #1034).

[21] Id. at 802.

[22] See Gendron, supra note 9, at 268.

[23] See Smulders and Evans, supra note 7, at 294.

[24] Nearly all refer to taxable supplies/turnover for a specified period. See James, supra note 6, at 57. However, there is considerable variation in the design of registration thresholds. Id. (describing two common forms). For instance, some are measured with regard to net VAT due rather than annual taxable turnover. See Consumption Tax Trends 2018: VAT/GST and Excise Rates, Trends and Policy Issues, OECD Publishing, Paris (2018) https://doi.org/10.1787/ctt-2018-en. Others require registration for all firms but do not impose VAT liability until a threshold is exceeded. See James, supra note 6, at 57-8. Many countries, including China, use a "threshold," but rather than exempting all small firms with revenues below the threshold, impose an alternative system of taxation, such as a turnover tax, for a subset of small firms. See Alan Schenk, Victor Thuronyi, and Wei Cui, Value Added Tax: A Comparative Approach (2015), at 449 ("[t]he

suppliers."[25] Small suppliers are not required to register for the VAT, but in many jurisdictions they are allowed to do so voluntarily.[26] This typically means that they would take the same steps in the same manner as would a larger business for which registration is mandatory.[27] Such steps often include applying for a GST number with the tax agency, keeping track of their sales and expenses to calculate their GST liability, and filing returns at the appropriate intervals.

The consensus among VAT economists that "arrangements for…voluntary registration are a key part of any well-designed VAT" is illustrated by language in the recently-released VAT Module of the IMF's Tax Policy Assessment Framework, which states: "[a] best practice system also allows for voluntary VAT registration of businesses falling under the threshold, provided these businesses are able to maintain reliable books of account substantiating their transactions."[28] But before explaining the main reasons cited for this view, the very existence of a registration threshold requires some explanation. Why have a registration threshold in the first place?

The registration threshold relates to the key improvement that a VAT makes over other kinds of consumption taxes, such as retail sales taxes, turnover taxes, manufacturers' sales taxes, and others. The improvement is the "invoice credit" mechanism, in which "registered businesses offset the VAT they have been charged on their purchases ('input VAT') against the liability ('output VAT') on their sales, remitting only the net amount due."[29] By allowing firms that—crucially—are registered for the VAT—to claim refundable credits for their input VAT, the VAT succeeds in taxing the net value of the final consumption of goods and services. Input-crediting thus avoids the nefarious "tax cascade" that can distort prices depending on the point in a chain of production at which a sale is made.[30] Put

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choice of terminology aside, China is not unique in separating traders into three groups: the smallest firms that are categorically exempt from the VAT; somewhat larger firms that are subject to a "special regime" intended to generate lower administrative and compliance costs per taxpayer than regular VAT compliance; and a final group of firms that are subject to regular VAT mechanisms").

[25] See Smulders and Evans, supra note 7, at 295.

[26] See, for example, Canada Revenue Agency website, which states as part of a table describing the registration rules: "You do not have to register. You may choose to do so _voluntarily_ if you provide taxable supplies in Canada," available at https://www.canada.ca/en/revenue-agency/services/tax/businesses/topics/gst-hst-businesses/register-a-gst-hst-account.html#Voluntary (emphasis and hyperlinks in original).

[27] See BRO ("Business Registration Online") system offered by Canada Revenue Agency to facilitate GST/HST registration and other tax tasks; available at: https://www.canada.ca/en/revenue-agency/services/tax/businesses/topics/registering-your-business/business-registration-online-overview.html]

[28] See IMF Tax Policy Assessment Framework, available at https://www.imf.org/en/Data/TPAF. See also Crawford et al., supra note 8, at 296.

[29] See Crawford et al., supra note 8, at 292 (noting that input crediting represents the key structural improvement of a VAT over its predecessors, which include general sales taxes that required sellers to collect tax on every transaction in every stage of production).

[30] See Schenk et al., supra note 24, at 2-5 (explaining how early VATs were guided by the "principle…[of] reduc[ing] the tax on sales by the tax already paid on business inputs to avoid the tax-on-a-tax [cascade] effect and to remove the incentive to vertically integrate a business"). The rationale for input-crediting is to avoid such efficiency-reducing "tax cascades" or a-tax-paid-on-a-tax. In a tax cascade, downstream buyers get

differently, an invoice credit VAT, by *not* taxing intermediate business-to-business transactions, promotes one of the holy grails of consumption tax design: "production efficiency." This is the principle, formalized by the Diamond-Mirrlees production efficiency theorem, that "any distortions of production decisions reduce aggregate output, which cannot be wise so long as there is some useful purpose to which that output could be put."[31]

But what about the obvious rejoinder: does not the virtue of production efficiency require that *all* firms in the chain of production be part of the VAT system? Indeed, if a sale is made by an unregistered business—such as a small supplier—its input VAT will, by definition, cascade into the price of its output.[32] Registration thresholds and their concomitant exemption of small firms are incompatible with the production efficiency of a VAT. Moreover, they violate the norm of avoiding discontinuous "notches" that create incentives for taxpayers to remain—through legal or illegal means—just outside the tax system. In the context of registration thresholds, the incentive to remain "small" (and thus exempt) looms large.[33] VAT theory argues, and recent empirical evidence has confirmed, that the presence of a registration threshold results in significant "bunching" by firms below the threshold. The real-world efficiency costs of bunching are a significant VAT policy concern.[34]

"stuck" with part or all of the embedded cost of tax paid on inputs.

[31] See Crawford et al., supra note 8, at 292 (they precede the quoted statement by noting "[a]ssuming that there are no restrictions on the government's ability to make transfers"—this is important, but not for our discussion).

[32] See Michael Keen and Stephen Smith, VAT Fraud and Evasion: What Do We Know and What Can Be Done?, 59 Nat'l Tax J. 861, 863 (Dec. 2006) (explaining that "[e]xemption…means that no tax is due on output, nor is a credit available for input VAT. Thus, the VAT 'sticks' on business purchases; the Australian term 'input-taxed' is more evocative"). Such sticky input taxes distort prices on the basis of the location of a product in the supply chain and create incentives to self-supply inputs rather than purchasing them at arms-length. See Schenk, supra note 24, at 2-5 (explaining how early VATs were guided by the "principle…[of] reduc[ing] the tax on sales by the tax already paid on business inputs to avoid the tax-on-a-tax [cascade] effect and to remove the incentive to vertically integrate a business").

[33] See discussion in Satterthwaite, supra note 16 at 767-8 (explaining these bunching responses as resulting from strategies that "include curtailing sales to stay artificially small, splitting one firm into two or more firms, and keeping some revenues out of sight of the tax authorities") (citations omitted).

[34] A number of studies have found significant behavioural responses by firms to the discontinuity created by a VAT registration or compliance-related threshold. See Kazuki Onji, The Response of Firms to Eligibility Thresholds: Evidence from the Japanese Value-Added Tax, 93 J. of Pub. Econ. 766, 771-73 (2009) (finding significant disparities of the densities of firms around the Japanese threshold between the standard VAT regime and a concessional "simplified filing scheme" for small suppliers; concluding that such findings are consistent with large firms masquerading as smaller firms through changes in organizational structure but not underlying economic activities); see Li Liu & Ben Lockwood, VAT Notches (CESifo Working Paper No. 5371, Sept. 1, 2016), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2615702 [https://perma.cc/RS73-WELQ] (documenting bunching below the UK VAT's registration threshold); see Jarkko Harju, Tuomas Matikka & Timo Rauhanen, The Effects of Size-Based Regulation on Small Firms: Evidence from VAT Threshold 1, 3 (CESifo Working Paper No. 6115, Sept. 2016), https://www.econstor.eu/bitstream/10419/147369/1/cesifo1_wp6115.pdf [https://perma.cc/47CP-KJN44CBC-9K72] (using data from the VAT in Finland to show that the "threshold causes a large and significant overall behavioral response. We find large excess mass of firms in the sales distribution just below

All this merely underscores the original concern: registration thresholds seem like a terrible idea. However, the explanation for their ubiquity stems from another empirical fact about real-world VATs: they have turned out to be less hassle-free than VATs in theory.[35] As Richard Bird and Pierre-Pascal Gendron comment, "the ideal VAT threshold was [thought to be] zero. As time went on, however, and more experience with the difficulties of imposing general sales taxes [i.e. the VAT] in fragmented economies with large informal sectors accumulated, conventional wisdom changed. It now suggests that a threshold should be set considerably higher in most countries…"[36]

While this "conventional wisdom" is not uncontested, its establishment was hastened by the leading (and perhaps only) theoretical model of optimal VAT thresholds (Keen and Mintz 2004).[37] With respect to small firms, the model suggests that the universal-registration cure may be worse than the production-inefficiency disease (of cascading sales taxes) that the VAT was designed to address.[38] One of the model's parameters is a firm's cost of VAT compliance. Studies have found this cost to be non-trivial in absolute and relative terms, especially for smaller firms that have scarce revenues to cover the costs of compliance.[39] The model also relies on evidence that the per-firm costs to tax agencies of administering and enforcing the VAT are high and, in the case of smaller firms, often cannot be justified by the VAT revenue at stake.[40] A number of sources cite a "rule of thumb" gleaned from across VAT jurisdictions, which relates firm size to VAT revenue: the top 10 percent of firms by size generate approximately 90 percent of VAT revenue.[41] Keen and Mintz's model of the optimal

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the threshold, implying that small firms actively avoid VAT liability…Our results strongly indicate that compliance costs are the key factor in explaining the observed behavior").

[35] Cedric Sandford, Minimising the Compliance Costs of a GST, 14 Australian Tax Forum 125, 128 (1997).

[36] See Richard Bird and Pierre-Pascal Gendron, The VAT in Developing And Transitional Countries 115 (2007) (noting a rule-of-thumb amount of about $100,000; however, the inflation-adjusted rule-of-thumb threshold for the present date would be significantly higher).

[37] See also Michael Keen and Jack Mintz, The Optimal Threshold for a Value-Added Tax, 88 J. Pub. Econ. 559 (2004) (offering a general equilibrium theory addressing the "efficiency concerns" that arise from "potential distortions arising from the differential treatment of those above and below the threshold…The common concern is that those below the threshold will be placed at a competitive advantage relative to those above"). The UK study cited in Part I reveals that the conventional wisdom of very high thresholds is coming under pressure as evidence of avoidance mounts. See Klahr et al., supra note 12, at 5-7.

[38] Id., at 564 and 565-8.

[39] See Luca Barbone, Richard M. Bird and Jaime Vazquez-Caro, The Costs of VAT: A Review of the Literature, CASE Network Reports No. 106/2012, at 15 (finding "[t]he regressivity of the compliance burden of taxation, and VAT in particular, which can be taken as definitively established in the literature, in particular stems from the large diseconomies of scale involved in complying with tax requirements, together with the learning curve effect that militates strongly against small firms"). See also Bird and Gendron, supra note 36, at 120 (summarizing empirical findings as universally consistent with compliance cost regressivity).

[40] See Keen and Mintz, supra note 37, at 564.

[41] See Liam Ebrill, Michael Keen, Jean-Paul Bodin and Victoria Summers, The Modern VAT 115, 117-18 (2001) ("[i]n most countries, a surprisingly small number of VAT registrants, sometimes less than a few dozen, account for 80% or 90% of VAT collections…[d]espite significant variation, a useful rule of thumb is that the largest 10 percent of all firms commonly account for 90 percent or more of all turnover…This

registration threshold acknowledges that production efficiency is sacrificed by exempting small firms, but that it would be worse—in terms of the magnitude and distribution of compliance and administration/enforcement costs—to mandate that they register.

The policy evolution of optimal registration thresholds thus elevates the importance of the question "why offer voluntary registration?": a higher threshold implies that more firms will have this option. The answer relates directly to the dynamics discussed above: the mechanism of voluntary registration, by allowing (weakly) more firms to be part of the VAT system, reclaims some of the production efficiency that is lost from exempting small firms. It acts as a structural complement to *having* a registration threshold in the first place. And, in countries with a (non-zero) registration threshold, offering voluntary registration is exceedingly common.[42]

This sketch of the basics of an invoice-credit VAT is intended to provide background for assessing the viability of a signaling account of voluntary registration.[43] However, one of the questions posed in the introduction remains unanswered: why would a small firm find it advantageous to exercise the option to register voluntarily? Put differently, production efficiency might well improve social welfare by promoting aggregate efficiency, but what about private costs and benefits that, on the margin, influence the decisions of a resource-constrained small-firm entrepreneur? To answer this question, Part IV returns to the existing literature on VAT mechanics to sketch out the formality chain effect model of voluntary registration. However, before engaging with that account and the ways in which it presents a challenge for the signaling story, Part III outlines the latter with reference to Spence's education-productivity model.[44]

Part III: The signaling model

    A. Information asymmetry

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seemingly universal feature has important implications for the relationship between the threshold and the tax base: starting from a low level, a $1 increase in the threshold is initially very cheap in terms of revenue foregone, but becomes much more expensive at higher levels of turnover;" noting, however, that there is "significant variation" across jurisdictions in the concentration of revenue across the distribution of firms…[but] at least 88 percent of turnover occurs in the largest 10 percent of firms"). See also Keen and Mintz, supra note 37, at 573-74 (noting that "in practice, the concentration of activity amongst a relatively few enterprises is such that it is indeed often the case that even a relatively high threshold catches an extremely large proportion of the potential base").

[42] See Smulders and Evans, supra note 7. Exceptions to the rule of allowing voluntary registration exist in Israel, Korea and the Netherlands. See Consumption Tax Trends 2016: VAT/GST and excise rates, trends and policy issues, OECD Publishing, Paris, at 89, available at https://doi.org/10.1787/ctt-2016-en. See also IMF TPAF, supra note 28 (stating that "VAT laws in some countries also specify a minimum threshold under which voluntary registration is not allowed").

[43] [Space permitting, insert numerical example of how input credits work—on file with author.]

[44] See Spence, supra note 4, at 358 (modeling education acquisition by future job-seekers; assuming that "individuals…select signals (for the most part, I shall talk in terms of education) so as to maximize the difference between offered wages and signaling costs").

A background setting of asymmetric information is a prerequisite for any conversation about signaling. In Spence's model, information asymmetry exists among various participants in the market for human talent. In particular, there is a buyer (employer) and a group of sellers (job applicants). The employer, who needs to hire workers, cannot observe the quality-types of the applicants, where quality is measured by productivity.[45] Under the simplifying assumption that there are applicants of only two types—high-quality and low-quality—the profit-maximizing employer will seek to offer a wage that matches the quality-type of the applicant. But, because of asymmetric information, the employer cannot differentiate among applicants, and so cannot offer a high wage to the high-quality applicant and vice-versa. In such a circumstance, the employer's best response is to split the difference (so to speak) by offering every applicant an average wage.[46] However, this causes an "unraveling" problem: high-quality workers will not accept the wage, and will never match with the employer. The employer knows this, so will offer only a low wage; as a result, it will be able to hire only low-quality workers. Absent the signaling magic that is described immediately below, high-quality job applicants can be expected to leave the market in exasperation, poverty, or some combination thereof.

B.   Attributes of a viable signal

1.   Requirement 1: Costliness

Spence defines a "signal" as something that can be influenced—at a cost—by an individual.[47] The model construes the concept of "cost" broadly: "[s]ignaling costs [can] include psychic and other costs, as well as direct monetary costs.[48] One element of cost, for example, is time."[49] In addition, signals must be relevant to how the signal's recipient (the employer, in Spence's setting) views the signaler. That is, the signal must convey something about the signaler's quality, in the particular sense that it must influence whether the recipient of the signal wants to form a cooperative or contractual relationship with the signaler.[50]

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[45] Id., at 356 ("[i]n most job markets the employer is not sure of the productive capabilities of an individual at the time he hires him…Nor will this information necessarily become available to the employer immediately after hiring. The job may take time to learn. Often specific training is required. And there may be a contract period within which no recontracting is allowed…hiring is an investment decision" made under conditions of uncertainty).

[46] Id. ("[t]o hire someone, then, is frequently to purchase a lottery").

[47] A signal stands in contrast to an "index," which is an immutable characteristic that cannot be influenced at any cost (or is pre-determined, like age). Id. at 357 (explaining in the job applicant-potential employer context, "I shall refer to observable, unalterable attributes as indices, reserving the term signals for those observable characteristics attached to the individual that are subject to manipulation by him").

[48] Id. at 358 ("[s]ignaling costs play a key role in this type of signaling situation").

[49] Id. at 359.

[50] Id. at 357 ("[o]f those observable, personal attributes that collectively constitute the image the job applicant presents, some are immutably fixed, while others are alterable…signals and indices are to be regarded as parameters in shifting conditional probability distributions that define an employer's beliefs").

In Spence's employment context, this means that the signal must be relevant to the employer in determining the wage offered to a given applicant.[51] A signal will have value if it can help the employer update, over successive hiring rounds, its beliefs about the applicant's quality to allow it to offer the appropriate (high versus low) wage. In an equilibrium, the employer's beliefs and the wage schedule become "self-confirming."[52] Spence describes this iterative process as follows: "an equilibrium can be thought of as a set of employer beliefs that generates offered wage schedules, applicant signaling decisions, hiring and ultimately new market data [based on *ex post* observed productivities] over time that are consistent with the [employer's] initial beliefs."[53]

2. Requirement 2: cost of signal varies inversely with quality

Once it is clear that the putative signal is costly, to get to an equilibrium that allows *both* high- and low-quality applicants to be matched with appropriate wages, a second requirement must be met: the cost of sending the signal must vary inversely with the applicant's quality.[54] The intuition is that the easier a signal is to send for an applicant, the stronger and more revealing it will be upon receipt by the employer. Spence offers the possibility that education may work as a signal by observing that education may be less costly to obtain for high-quality types.[55] Here, it is important to note that, in Spence's formulation, the *only* function of education is as a signal. Learning as a substantive process does not occur in the model: education does not augment the underlying productivity of either type of applicant. Its sole purpose is informational.[56]

In the model, each applicant-type seeks to maximize the difference between her offered wage and her cost of education.[57] A applicant will invest in education only if its net benefits are positive, which will occur if the difference between the average wage she will be offered with no signaling and the high wage she will be offered with signaling exceed her cost of obtaining education. A signaling equilibrium that separates high-quality and low-quality applicants emerges when it is beneficial only for high-quality applicants (but not low-quality applicants) to invest in education. This will be the case when, for a low-quality applicant, the cost of investing exceeds the wage-differential benefit from

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[51] Id. at 357-8 ("[o]n the basis of previous experience in the market, the employer will have conditional probability assessments over productive capacity given various combinations of signals and indices. At any point of time when confronted with an individual applicant with certain observable attributes, the employer's subjective assessment of the lottery with which he is confronted is defined by these conditional probability distributions over productivity given the new data").

[52] Id. at 360.

[53] Id.

[54] Id. at 358 ("[i]t is not difficult to see that a signal will not effectively distinguish one applicant from another, unless the costs of signaling are negatively correlated with productive capability").

[55] Id. at 357 (noting that "education is something that the individual can invest in at some cost in terms of time and money").

[56] Id. at 358 and 368 (acknowledging that "there may be other returns to education. It may be a consumption good or serve as a signal of things other than work potential (status for example). These returns should be added to the offered wage schedule;" however, education is in the base model is "strictly unproductive").

[57] Id. at 362.

mimicking the high-quality applicant.[58] Under such circumstances, over many successive rounds of hiring, the employer's beliefs about the quality associated with educated applicants will be confirmed and solidified.[59]

The next section tackles the question of whether it makes sense to view voluntary VAT registration by small firm entrepreneurs through the lens of Spence's signaling model.

Part IV: Applying the signaling model to voluntary registration by small firms

A. Background requirement: is there asymmetric information?

The private information held by job applicants about their productivities that Spence modeled in the context of hiring has been analogized to countless other markets, including commercial markets. George Akerlof explored this setting using the example, among others, of low-quality used car "lemons" (1970).[60] In a commercial market that contains high-quality products as well as lemons, an entrepreneur who has private information about the high quality of her product will face a problem that is similar to that of the high-quality job applicant.[61] Potential customers, because they remain uninformed about the product's high quality, will be willing to pay a price corresponding only to the average quality (i.e., the midpoint between the prices for high- and low-quality products).[62] The entrepreneur, who under competitive market assumptions cannot survive unless she recoups her costs of producing a high-quality product, will be unable to accept this average price. As a result, she will be driven out of the market in a fashion similar to that of the high-quality job applicant in Spence's model.[63] This is very sad because the gains from trade that would have made both the entrepreneur and her customers better off are forfeited—solely due to the information structure of the market![64]

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[58] Id. at 358 ("[f]or if this condition fails to hold, given the offered wage schedule, everyone will invest in the signal in exactly the same way, so that they cannot be distinguished on the basis of the signal").

[59] Id. at 362-4 (emphasizing, however, that there can be an infinite number of equilibriums and that not all "equilibria are…equivalent from the point of view of welfare. Increases in the level of y* [education] hurt Group II [high-productivity] while, at the same time, members of Group I [low-productivity] are unaffected. Group I is worse off than it was with no signaling at all. For if no signaling takes place, each person is paid his unconditional expected marginal product).

[60] See George Akerlof, The Market for 'Lemons:' Quality Uncertainty and the Market Mechanism," 84:3 Quarterly Journal of Economics 488, 493 (1970) (illustrating the problem of adverse selection in commercial markets).

[61] The entrepreneur seeks to form various relationships with counterparties to grow her firm, not just with buyers. Other counterparties might include suppliers of inputs, employees, creditors, or equity investors. Here, for simplicity, I will focus on the entrepreneur's problem of matching with customers willing to pay a competitive price for her product.

[62] In a simple scenario, this might be the midpoint between a high- and low-quality price.

[63] See Akerlof, supra note 54, at 489 ("good cars may not be traded at all").

[64] Id. at 490 (emphasizing that in the more realistic scenario with a continuous distribution of quality-types, "even worse pathologies can exist;" showing formally that the market collapses entirely as "it is quite possible to have the bad driving out the not-so-bad driving out the medium driving out the not-so-good driving out the good in such a sequence of events that no market exists at all").

It is reasonable to believe that small firms, like sellers of used cars, are likely to participate in markets characterized by non-trivial amounts of asymmetric information. First, as compared to larger and more established firms, providing credible information about quality to buyers may be more difficult. For instance, small firms are unlikely to have invested (yet) in other costly signals of quality through advertising and brand-promotion. So even if complete information exists for some sellers in a market, it may remain incomplete with respect to the new or the small.[65] Second, small firms are unlikely to have a broad base of customers who are willing to vouch for the firm through referrals or customer reviews. In such a context, the "lemons" problem is not farfetched, and small firms may be more likely to be on the lookout for viable signals—verifiable ways to communicate their high quality—that can help them overcome the problem of information asymmetry and help them make inroads into the market.

Taking as a given the presence of asymmetric information for small firms and their customers, the balance of this Part assesses whether the two central requirements of the signaling model, as discussed in Part III.B, are satisfied.

B.   Requirement 1: is voluntary registration costly?

Signaling must be costly, and can be thought of as investing in an asset that yields value in the form of providing credible information to one's counterparties. In the context of registering for and complying with a fairly complicated tax, is there evidence on its costliness?

1.   *VAT compliance is costly, especially for small firms*

The costs to a firm of VAT registration may include a one-time initial ("fixed") cost of registering and putting in place systems to charge VAT. Being registered for VAT also entails annual ("periodic") costs of charging customers, keeping track of input credits, calculating net tax owing, and filing VAT returns.[66] These costs are incurred each accounting period. Here, to streamline the analysis, I assume that the fixed cost of actually registering and implementing start-up systems is small compared to the annual variable cost of VAT compliance for a given small firm.[67] Therefore, when referring to the costs of voluntarily joining the VAT system, "registration cost" refers to a small firm's periodic costs of complying with VAT.

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[65] Id. at 499-500 (discussing the "brand-name good" as an example of an institution that "counteracts the effects of quality uncertainty").

[66] See Cedric Sandford, Minimising the Compliance Costs of a GST, 14 Austl. Tax F. 125, 128 (1997).

[67] The signaling account does not rely on this assumption; in fact, relaxing it gives rise to another way in which the one-time fixed cost itself voluntary registration can work as a signal much like a one-time investment in education. I do not pursue this argument, however, because I am not aware of empirical support for the proposition that initial start-up compliance costs are large in magnitude relative to the ongoing variable costs of VAT compliance. One exception to this may arise in the context of a newly-adopted VAT, where firms must navigate systems that are new to the entire taxpaying population. In such cases, proposals to provide subsidies to registering firms have gained traction (including in Canada). When Canada adopted the GST in 1991, one of its transition measures was a sliding-scale payment to small firms to "offset the costs involved in the introduction of GST." See Prafula Fernandez and Lynne Oats, "GST and The Small Business, Curtin Business School Working Paper Series 98.01 (April 1998), at 25. Payment was provided upon registration,

There is a large body of empirical research on VAT compliance costs.[68] As Kathryn James puts it, "simplicity is not…[the] VAT's greatest virtue."[69] Numerous studies establish not only that VAT compliance costs generally are significant but also that they are disproportionately more burdensome for smaller firms. A recent review of this empirical literature concluded that, across jurisdictions, the costs involved in complying with a VAT are highly regressive with respect to a firm's size.[70] Sharon Smulders and Chris Evans state in a recent article that "[VAT compliance] costs are…high and significant, as well as severely regressive — even more so than for other business taxes."[71] They explain that, for large and small firms alike, "[i]t is not just the frequency of reporting and payment that contributes to VAT compliance costs. The length of a VAT return and the amount of information requested by a revenue authority in respect of VAT can also have a significant impact on the compliance costs of taxpayers."[72] In general, the registration costs associated with VAT registration for small firms are substantial.[73]

However true it may be that VAT registration is costly, this general costliness is not, on its own, sufficient to meet the "costliness" requirement of the signaling account. Studies showing that, on a relative basis, registration costs for smaller firms exceed those of larger firms are also not specific enough to be helpful. The signaling account requires attention to the costs of being part of the VAT system under very particular circumstances: the decision to voluntarily register as executed by a small firm that otherwise would be exempt from VAT by virtue of a statutory registration threshold.

Such "particular circumstances" will vary, of course, from one jurisdiction to another depending on the level of the applicable registration threshold and the specific rules surrounding it. Under these varying circumstances, viewing VAT compliance costs in isolation can be misleading. To address the relevant issue of the costliness of *voluntary* registration, which is by definition only available to exempt small firms as defined under a particular statute, the next sub-part resolves the suspense surrounding the final piece of the VAT mechanics discussion in Part II: why would a small firm register voluntarily?

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and enterprises with no more than $600,000 in sales received a cash payment of $300, while enterprises with sales from $600,000 to $2 million received a cash payment of the lesser of 0.5 percent of their sales and $1,000. Id. In addition, to complement this subsidy, during 1991 and 1992, a special provision allowed full expensing for income tax purposes of the capital cost of electronic point-of-sale and related inventory equipment. See L. Dana, A Goods and Services Tax (GST) and the Small Business Sector: Some Canadian Reflections, 52:4 Australian J of Public Admin 457, 461 (1993).

[68] See Chris Evans, Taxation compliance and administrative costs: an overview, in Michael Lang, C. Obermair, J. Schuch, C. Staringer and P. Weninger, Luca Barbone, eds., Tax compliance costs for companies in an enlarged European Community (2008), at 458.

[69] See James, supra note 6, at 31 (citations omitted).

[70] See Barbone et al., supra note 39, at 15.

[71] See also Smulders and Evans, supra note 7, at 283-4.

[72] Id. at 288.

[73] Id. at 288 and 307 (elaborating that "[i]t is not just the frequency of reporting and payment that contributes to VAT compliance costs. The length of a VAT return and the amount of information requested by a revenue authority in respect of VAT can also have a significant impact on the compliance costs of taxpayers"); Bird and Gendron, supra note 36, at 120; Barbone et al., supra note 39, at 1-5, 15; Evans, supra note 67, at 458.

2. *However, for some voluntary registrants, formality chain effects offer benefits*

Phrasing the above query in reverse, are there net *benefits* available to small firms that voluntarily register? If the action that is an alleged signal provides a benefit to the alleged signaler rather than imposing a cost on her, it is not a signal in the informational sense. Eric Posner, who uses the signaling model to explain a range of social norms that are relevant to law (including social norms surrounding tax compliance), states:

> Signals are costly actions that are recognized as such by those who observe them, and they have the function of disclosing information about the person who sends the signal. An action is not a signal if the actor intrinsically enjoys the action (like eating ice cream) or obtains some benefit from it (like selling goods) independent of the information benefit.[74]

This is a caution well-heeded in the present context. The formality chain effect model explains why a small firm may opt into the VAT. It identifies circumstances under which voluntary registration is likely to be economically beneficial, net of registration costs, to the small firm.[75] This is not good news for the signaling model.

The formality chain effect model posits that voluntary registration may confer benefits on a small firm through two distinct but related channels, each of which relies on input crediting.[76] The first, the "customer channel," occurs when a small firm sells her output to a formal, VAT-registered customer. It relies on the proposition that such a customer will be, at worst, indifferent to paying VAT on the sale price of the product purchased from a voluntarily registered small firm. This is because the registered customer can simply claim its input VAT as a credit against its own output VAT liability. Moreover, VAT-registered customers may have an affirmative preference for trading with firms that are VAT-registered, due to the non-tax positive spillovers from formality. These may include receiving formal invoices that improve internal accounting and managerial performance or enforcing contracts at lower cost on the basis of such documentation.[77]

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[74] See Posner, supra note 4, at 1787.

[75] See Aureo de Paula and Jose A. Scheinkman, Value-Added Taxes, Chain Effects, and Informality, 2 Amer. Econ. J: Macroeconomics 195-221 (Oct. 2010), at 196 (measuring and referring to the formalization achieved through voluntary registration as a "chain effect;" testing the theory with data from Brazil and finding that "various measures of formality of suppliers and purchasers (and its enforcement) are correlated with the formality of a firm"); Liu and Lockwood, supra note 34, at 3 (showing that "voluntary registration by a firm is more likely when either (i) the cost of inputs relative to sales is high, or (ii) when the proportion of B2C sales by the firm is low. The intuition for (ii) is simply that if most customers are VAT-registered, the burden of an increase in VAT can easily be passed on in the form of a higher price because the customer itself can claim back the increase. The intuition for (i) is that when input costs are important, registration allows the firm to claim back a considerable amount of input VAT").

[76] See discussion using this terminology in Satterthwaite, supra note 16, at 766.

[77] See Jeff Pope, Estimating and Alleviating the Goods and Services Tax Compliance Cost Burden on Small Businesses, 11 Revenue L. J. 1, 13 (2001).

The second channel is the "input channel." The focus of the input channel is on the small firm's ability to claim input credits for *itself* rather than any interactions with customers. The crux of the channel is that input credits in most developed-country VATs are fully refundable to registered firms.[78] Thus, where a small firm spends more on its purchases of inputs from VAT-registered firms than it collects in revenues from customers (generates a loss in this manner), registering voluntarily for VAT will put it in a net refund position. The small firm in this situation will be able to claim a cash benefit from voluntarily registering.[79]

But even if the small firm is *not* in a net refund position, voluntary registration can help a small firm "unstick" the input VAT that would otherwise become embedded in its prices. This improves the small firm's cost structure relative to its unregistered competitors. The input channel requires, of course, that the small firm has paid VAT on some purchases of inputs (that is, sourced at least some of its inputs from VAT-registered firm). With a broad-based VAT, however, this likely will be the case even for a service firm where the dominant input is the entrepreneur's labor.[80]

Connecting this idea of "unsticking" tax paid on inputs back to the first channel for formality chain effects (the customer channel), a registered customer's awareness that the ability to voluntarily register on the part of its counterparty—the unregistered small firm—can be used as a bargaining chip. Because voluntary registration can improve a small firm's cost structure through the input channel, a registered customer (or prospective customer) of a small firm may encourage the small firm to voluntarily register. One might envision a statement by a registered customer to an unregistered small firm along the lines of, "we prefer sourcing our inputs from VAT-registered firms because registering allows you to claim input credits, which reduces your costs. And we don't suffer whether you charge us VAT on your output; you would, of course, give us a proper invoice to allow us to claim a credit. So, please register so that we can share in some of those cost savings in the form of more competitive prices!"[81]

The above sketch of the formality chain effect model conveys that voluntary registration is most beneficial for a small firm for which *both* the input and the customer channels are present. A recent study by Li Liu and Benjamin Lockwood tests the model's predictions using data from nearly the

[78] See Crawford et al., supra note 8, at 295-6.

[79] See Keen and Smith, supra note 32, at 863.

[80] Even a predominantly labor-based firm typically needs some tools or overhead that may be non-self-supplied (e.g., externally sourced from a VAT-registered firm).

[81] In case it is helpful to explore whether this same dynamic could be driven by VAT-unregistered customers of small firms, such as individual customers at retail, the following few sentences does that. Conceivably, a retail customer would appreciate a similar opportunity to share in the input cost savings available to the small firm upon voluntary registration. However, in this setting, the *absence* of the customer-channel (no credit can be used by the customer!) means that the input cost savings would need to offset, in some fashion, the burden of the VAT, the incidence of which will be split in some way between the small firm and customer. The most obvious instance in which such cost savings could be expected to outstrip any price increase experienced by the customer from charging VAT is when the small firm is in a net VAT-refund position, and registering allows her to claim the refund. However, being in this sort of a net loss position is unlikely to be sustainable in the long run for the small firm, so it would be surprising to see a customer-channel formality chain effect that is driven by the preferences of unregistered customers.

entire universe of UK firms that have revenues greater than or in the vicinity of the registration threshold (which happens to be high, at about $140,000). It finds robust empirical support for both the input and customer channels for formality.[82]

Where does this discussion leave us? The formality chain effect model reveals that, when an exempt small firm sources its inputs from VAT-registered firms and sells its output to VAT-registered customers, economic *benefits* may be gained from registering voluntarily. Viewed in isolation, this fact presumptively disqualifies voluntary registration as a candidate for applying Spence's signaling model: the alleged signal is not costly.

   3. *Net of formality chain effect benefits, which small firms will find voluntary VAT registration costly?*

However, neither the compliance cost discussion in section (1) nor the formality chain effect benefit discussion in section (2) can or should be viewed in isolation. The signaling model does not differentiate in regard to the *source* of an alleged signal's costs. It merely requires that, on a net basis, the signal imposes costs on the signaler. Moreover, the formality chain effect model does not engage with the messy reality of compliance costs. Although it implies that the benefits of registering must exceed the costs of doing so in any case where formality chain effects are observed, it does not consider how such costs interact with the customer and input channels. I take up that issue here.

The following variables represent the key elements of each discussion. For a given small firm in a given accounting period:

- C represents the registration cost (the small firm's cost of complying with VAT);
- I_r represents the value of inputs purchased from VAT-registered firms;
- S_u represents the value of sales to VAT-unregistered customers;
- α can take values from 0 to 1 and represents the extent to which the firm (rather than the final customer) bears the economic incidence of VAT; and
- t represents the rate of VAT that is applied by VAT-registered firms to their customers at the point of sale.

Voluntary registration will be profitable if:

$$I_r t \; > \alpha S_u t + C \tag{1}$$

Expression (1) is most simply stated in words: to be profitable for the small firm, the benefit of voluntary registration must be greater than its cost.[83] Specifically, if the value of a small firm's input

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[82] See Liu and Lockwood, supra note 34, at 21-26.

[83] Note that neither a variable representing the value of inputs purchased from VAT-unregistered firms (I_u) nor a variable representing sales to VAT-registered customers (S_r) appears in expression (1). With respect to I_u, informal inputs will not yield input tax credits even if the small firm registers, so they are immaterial to the voluntary registration decision. With respect to S_r, sales by a small firm to registered customers—even if

VAT (i.e., VAT paid on purchases from VAT-registered firms that would be refunded in the event of voluntary registration) is greater than the sum of (a) the small firm's output VAT charged to customers who cannot use credits (i.e., individual customers at retail or unregistered small firms) and (b) the compliance costs associated with being registered, then the small firm will have an economic incentive to register voluntarily.

The $\alpha S_u t$ term on the right side of the inequality requires a bit of explanation. By including on the "cost" side a scaled amount of output VAT charged to unregistered (think retail) customers, I assume that the economic incidence of the VAT may diverge to a lesser or greater extent from its legal incidence (which, as a consumption tax, is on the final consumer/retail customer). Where α is closer to 1, the more economic incidence diverges from legal incidence. Higher α implies that more of the economic burden of the VAT will be borne by the small firm rather than the unregistered customer in the form of lower profits.

The reason for including the α parameter is because economic incidence is determined by many factors, including the degree to which the market for the small firm's output is competitive. If the market for the small firm's output was perfectly competitive (an unrealistic and perhaps formally impossible assumption, but illustrative nonetheless), a voluntarily-registered small firm would not expect its unregistered customers to be indifferent to an increase in its tax-inclusive output price as a result of its choice to voluntarily register. To the extent that unregistered customers are able to purchase an output available at a lower price from unregistered small firms in the market, one can expect these arbitrage opportunities to be exploited. To avoid this, small firms that voluntarily register may need to bear the full incidence of the VAT.

Table 1 summarizes the four "boundary cases" that represent the possible all-or-nothing combinations of the input channel and the customer channel. The inequalities in each of the quadrants describe the circumstances under which voluntary registration will provide a net benefit for a firm with the given input and customer channel combination. They are the result of simply substituting, rearranging, and, where they are not relevant, letting terms drop from expression (1).

Specifically, the "yes" ("no") labels for the input channel refer to situations in which all of the small firm's inputs are purchased from VAT-registered (VAT-unregistered) firms. Similarly, the "yes" ("no") labels for the customer channel refer to situations in which all of the small firm's sales are made to VAT-registered (VAT-unregistered) firms. The intuition of the inequality in each quadrant is discussed further below.

Table 1: Circumstances under which a small firm with given input/customer channel
characteristics will benefit from voluntary registration

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the small firm registers and they are taxed—will be accompanied by a tax invoice that shifts the burden of the VAT downstream to the final consumer. This makes them similarly immaterial to the small firm's voluntary registration decision.

		Input channel?	
		Yes	**No**
Customer channel?	**Yes**	$C < I_r\, t$ (i)	$C < 0$ (ii)
	No	$C < I_r\, t - \alpha S_u\, t$ (iii)	$C < -\,\alpha S_u\, t$ (iv)

Quadrant (i) represents firms described by the formality chain effect model. Imagine a small firm in this quadrant as a wholesaler of manufactured goods: both the input and customer channels are listed as "yes" because the small firm sits in the middle of a formal supply chain. The inequality, stated in words, implies that such a small firm will decide to register voluntarily if its compliance costs of registering are less than value of its refundable input VAT. VAT charged on output in this situation does not enter into the calculus; the small firm's registered customers can simply credit this amount against their own VAT owing.

How likely is it that quadrant (i)'s inequality will be satisfied such that the small firm will benefit from registering voluntarily? This is, of course, an empirical question that depends on the values of the variables. But it is far from inconceivable. All it requires is that the small firm has purchased a sufficiently large quantity of inputs from VAT-registered firms, and its compliance costs are sufficiently small. Another way of thinking about this is that, unless the small firm's inputs are nearly exclusively non-taxable, such as labor, and thus would not generate input credits (e.g., $I_r\, t$ would be very small), the decision *not* to register under these conditions would be surprising. Small firms described by this quadrant that decline to register voluntarily might prompt negative inferences about their quality—perhaps they are not registered because they have high compliance costs for a reason that reflects on their reputation. Regardless, it seems reasonable to expect that, all else equal, small firms described by quadrant (i) will register voluntarily, just as the formality chain effect model suggests.

Quadrant (ii) describes a situation in which no inputs are purchased from VAT-registered firms, but all sales are made to VAT-registered customers. Imagine a small firm in this quadrant as an all-labor provider of services to larger firms (say, an entrepreneur that waters office plants). Small firms in this quadrant have no input channel effects. This implies that, although the small firm bears no liability for output VAT (its registered customers can use input credits to pass the burden of the VAT downstream) there are no benefits of registering voluntarily that can offset its compliance cost. Imagine, for instance, a freelance consultant who provides advice to VAT-registered firms as a sideline to her main work, using no taxable inputs. The inequality that appears in quadrant (ii) can be satisfied only if compliance costs are negative. This is highly unlikely: having a negative compliance cost would imply that a positive consumption benefit was derived by the small-firm entrepreneur from VAT compliance.[84] Thus, to the extent that small firms have positive compliance costs, we would not expect to see voluntary registration for firms described by this quadrant—

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[84] Having a negative value for C would imply that the small-firm entrepreneur would be willing to pay to enjoy the experience of complying. Even for someone who loves studying VAT statutes, this seems a bit far-fetched.

absent signaling—even in the event that a customer of the small firm demanded it. In response to such a demand, the entrepreneur would point out simply that voluntarily registering would cause the firm to face further costs, not savings, at least a part of which the registered customer would need to bear.

Quadrant (iii) describes a situation in which all inputs are purchased from VAT-registered firms but all sales are made to VAT-unregistered customers (individuals at retail or non-voluntarily registered small firms). Imagine a small firm in this quadrant as a seller of hand-set gemstones on a platform such as Etsy: the entrepreneur sources the raw materials from VAT-registered suppliers, but sells her output at retail. For voluntary registration to be profitable under such circumstances, the benefit of claiming input credits net of the cost of output VAT must be greater than the compliance cost. This means that the small firm must operate at such a significant loss that the cash received from the (net) VAT refund more than offsets its compliance costs. How plausible is it for a small firm to be in this situation? While an initial period of losses may be expected as the firm gets off the ground before significant revenues can be claimed, it is unlikely that small firms will be able to sustain themselves indefinitely in this quadrant (i.e., in a loss position for many periods). In equilibrium over time, such small firms will be expected to drop out as they fail. Moreover, there is some evidence gathered in the context of Canada's very low registration threshold that loss firms described by quadrant (iii) may be unwilling to incur the registration and compliance costs that are a prerequisite for claiming an input tax refund.[85]

Finally, quadrant (iv) describes a situation in which the small firm has no inputs from VAT-registered supplies and all sales are made to VAT-unregistered customers. Imagine a small firm in this quadrant as a pet-, child- or apartment-sitting entrepreneur: her input is predominantly labor and she has individual clients but no VAT-registered business clients. Deriving a benefit from voluntary registration in this scenario is even more implausible than for a firm described by quadrant (ii). This is because the inequality will be satisfied only if the cost of compliance is less than an already-negative value. In other words, there will be a benefit only if C is so large in the negative direction as to be less than the opposite (negative) of the amount of VAT collected on the firm's sales to unregistered customers. This strains credulity even for a sitter-entrepreneur with very high levels of enthusiasm for tax compliance activities, and implies that voluntary registration under such circumstances will be among the strongest of signals.[86]

4. *Illustration: costs of voluntary registration for a hypothetical small firm*

The four quadrants in Table 1, as noted above, demarcate the range of possibilities by identifying the all-or-nothing boundary cases of the customer and input channels in the presence of compliance costs. To illustrate its implications and show how the costliness of voluntary

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[85] See Satterthwaite, supra note 16, at 762, 772, 790-95, 804 (finding evidence consistent with customer channel chain effects but no evidence consistent with input channel chain effects among Ontario small suppliers in sample; contrasting with Liu and Lockwood's evidence of both channels; hypothesizing that the absence of input channel chain effects might be specific to Ontario's very low threshold, pursuant to which voluntary registrants are, by definition, microentrepreneurs).

[86] Thank you to Wei Cui for this excellent point.

registration plays out in a more mainstream case (where both input and customer channels are present for a small firm), suppose a hypothetical small firm located in a VAT jurisdiction with a registration threshold of $30,000 has the following characteristics. Assuming an accounting period of one year, let:

C = cost of complying with VAT = $500
I_r = value of inputs purchased from VAT-registered firms = $5,000
I_u = value of inputs purchased from VAT-unregistered firms = $1,000
S_r = value of sales to VAT-registered customers = $10,000
S_u = value of sales to VAT-unregistered customers = $15,000
α = 0.5 (for simplicity)
t = rate of VAT that is applied by registered firms to sales = 0.20

These characteristics describe a profitable small firm: it expends $6,000 on inputs from both registered and unregistered firms, and generates $25,000 in total sales, qualifying it as a small firm and making VAT registration voluntary rather than mandatory. Plugging these values into expression (1) above, voluntarily registering will benefit the firm only if the following inequality holds:

$$I_r\, t \; > \; \alpha S_u t + C \qquad \rightarrow \qquad \$5,000 * 0.2 \; > \; 0.5 * \$15,000 * 0.2 + \$500$$
$$?$$

For this hypothetical small firm, voluntary registration will not be economically beneficial: $1,000 is not greater than $2,000. On the basis of the customer and input channels and the compliance costs that are reflected in the variables, one would not expect that this firm would voluntarily register: doing so is costly, to the tune of $1,000 (which may not seem large in absolute terms, but for this firm, amounts to 4 percent of its gross receipts). For this hypothetical small firm, the costliness requirement of Spence's model would be met with regard to its choice to register voluntarily.

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Even accounting for the potential benefits of voluntary registration, a subset of small firms (quadrants (ii) and (iv)) is likely to find voluntary registration to be costly: those without significant input credits that can be claimed upon voluntary registration. The next section engages with the question of what factors might motivate this subset of firms to voluntarily incur this cost.

C. Requirement 2: do voluntary registration costs vary inversely with small firm quality?

The second requirement of the signaling model is that the cost of sending the signal to the signaler must be *inversely related* to its quality. As noted above, "quality" in this context refers to characteristics that increase the willingness of the signal's recipients to transact with the signaler. I briefly sketch here three ways in which this inverse relationship between cost of voluntary registration and small firm quality might arise.

1. *Compliance ability as proxy for quality*

The first relates directly to the inequalities above—voluntary registration will, by definition, be more affordable for small firms with relatively low costs of VAT compliance. Notwithstanding studies finding that average VAT compliance costs are significant and especially so for small firms when measured as a percentage of turnover, there is significant variation in the actual compliance costs experienced by different small firm entrepreneurs.[87] Higher or lower costs might stem from a variety of factors: a small firm entrepreneur may have prior experience with tax compliance generally in the context of business, or with the VAT in particular. Or, they may be especially sophisticated about, comfortable with, or personally committed to performing compliance-related tasks.

Higher-sophistication or higher-experience entrepreneurs may be likely to find the specific task of voluntary VAT registration and compliance less intimidating than lower-sophistication or lower-experience entrepreneurs for a number of reasons. They may be more sophisticated about navigating problems generally, more intellectually able, or simply better-resourced with respect to networks of people to whom they can turn for help. Such problem-solving capacity, intellect, or network resources may also be correlated with higher levels of business success, and therefore may function as a proxy for quality.

2. *High commitment to compliance as a proxy for quality*

The second way in which an inverse relationship between cost of voluntary VAT registration and small firm quality might arise relies on Posner's analysis of tax compliance and social norms.[88] Suppose that taxpayers vary in their tastes for or commitments to legal and tax compliance (for simplicity, suppose there are high types and a low types). To the extent that taste for compliance is (1) positively related to firm quality and (2) negatively related to a small firm entrepreneur's cost of registering voluntarily (her internal sense of her compliance cost, C) there may be scope for signaling. I examine the case for each of these propositions in reverse order.

With respect to proposition (2), high commitment to compliance implies high aversion to the risk of being non-compliant. In the context of voluntary registration, such risk aversion may increase the small-firm entrepreneur's propensity to voluntarily register, particularly where she faces

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[87] This may be due to many factors including opportunity cost of time and psychic costs of tax-related tasks. See Nahida Faridy et al., Complexity, Compliance Costs and Non-Compliance with VAT by Small and Medium Enterprises in Bangladesh: Is There a Relationship?, 29 Austl. Tax F. 281, 292-309 (2014) (finding evidence from a mixed-methods survey that compliance costs are regressive with respect to firm size; also documenting substantial variation in compliance costs across individual small business respondents).

[88] To the extent that the entrepreneur values registration as insurance, it may signal the entrepreneur's taste for tax compliance (e.g., her aversion towards tax non-compliance). See Posner, supra note 4, at 1787-89 (2000) (explaining the repeat prisoner's dilemma game in the context of time preferences: "'[b]ad types' have high discount rates, meaning that they value future payoffs relatively little compared to current payoffs. 'Good types' have low discount rates. The standard result in the repeated model is that a necessary condition for cooperation is that both players have a sufficiently low discount rate").

some probability of unwittingly exceeding the registration threshold through an unexpected or lumpy sale that could push her turnover over the threshold without her knowledge, thereby causing her to break the law. Voluntary registration thus could provide "insurance" against the risk of non-compliance. This is especially true when the statute has detailed (and often complex) rules for assessing whether turnover has exceeded the registration threshold is complicated and imposes fines for late registration.[89] Under such circumstances, a high commitment to compliance implies high willingness to purchase "insurance" in the form of voluntary registration, which in turn translates into a low subjective cost of registering voluntarily. Remaining unregistered is particularly costly for these types.

Proposition (1) is less straightforward. It seems plausible that, in the context of firms rather than individuals, counterparties would want to match their own compliance commitment-type with that of their trading partners rather than exhibiting a blanket preference for a single type. For instance, a low-commitment buyer might view a high-commitment seller's costly investments in compliance as wasteful, and would be unwilling to bear the cost of such investments.

However, legal developments relating to VAT enforcement within supply chains complicates this story. In a line of recent cases, the Court of Justice of the European Union ("CJEU") has assessed the extent to which Member States can adopt provisions in their national VAT statutes that require taxpayers to scrutinize the legitimacy of their firms' VAT invoices.[90] In her assessment of a recent case (*SC Paper Consult*) addressing this issue, Caroline Heber argues that CJEU jurisprudence has validated the ability of Member States to impose significant (although not unlimited) monitoring duties on taxpayers.[91] Heber also suggests that Member States will respond by increasing their reliance on such provisions: "this case highlights what will become more critical in the future: the profound knowledge of the taxable person about the tax compliance of his firms and customers. Thus, taxable persons will need to invest more resources and power to monitor their supply chain for the right to deduct input VAT."[92]

This suggests that, particularly in VAT jurisdictions that adopt such "monitoring"-type provisions, the positive spillovers to uninformed counterparties of contracting with high-commitment firms (whether small or otherwise) will be magnified to the extent that they increase

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[89] For example, in Canada, the registration threshold is defined by taxable supplies on a rolling four-quarter basis, in which turnover must be calculated monthly. See Excise Tax Act, supra note 15, at ss. 149-[60]. A busy small-firm entrepreneur plausibly might not have sufficient resources for this level of monitoring.

[90] See Caroline Heber, Input Tax Deduction, in Michael Lang (ed.), CJEU - Recent Developments in Value Added Tax (Vienna, Linde Verlag, 2017), at 345-7.

[91] Id.

[92] Id., at 347 (describing the SC Paper Consult case as referring to "its settled case law," and quoting the opinion as stating "…'it is not contrary to EU law to require a trader to take every step which could reasonably be required of hi to satisfy himself that the transaction which he is carrying out does not result in his participation in tax evasion'"). Note that the CJEU in this case found that the provisions of the Romanian VAT statute "went beyond what was necessary to achieve the objective [of ensuring the proper collection of VAT and the prevention of VAT evasion]…and thus the national provisions at issue were not in line with the EU VAT Directive." Id. at 346.

the benefits of avoiding low-commitment firms. In such a setting, voluntary registration may work as a signal in its absence: a failure to register may be viewed as a red flag.

3. *Growth expectations as proxy for quality*

A third way in which an inverse relationship between a small firm's cost of voluntary registration and its quality might arise relates to the small firm's private information about its expectations for growth.

The more rapid the growth of a given small firm, the shorter the time until the revenue level demarcated by the registration threshold is crossed, "bigness" is achieved, and VAT registration becomes mandatory. For a quickly-growing firm, accelerating this moment by registering voluntarily is less costly—from an opportunity cost perspective—than for a slowly-growing firm. In addition, accelerating voluntary registration earlier in time may offer the small firm the benefit of insuring against accidental VAT noncompliance. This could occur if revenues grew past the threshold but the entrepreneur failed to notice, or noticed but, unintentionally, failed to register within the required timeframe.

Expectations regarding growth are a natural proxy for quality. Absent anti-competitive practices or fraud, growth can be seen as a validation by the market of the value offered by the firm. A small firm's low expected value of the opportunity cost of voluntarily registering for VAT can be a result of robust expectations for growth, and thereby can function as a signal of quality.

4. *Threats to signaling*

The idea that voluntary registration will allow firms to sort themselves observably by quality may have more coherence than initially expected. But there is a nagging question: what about small firms operating at a loss, those described in quadrant (iii)? While this cohort no doubt will contain some early-stage growth firms that may go on to experience very high returns later in time (and thus also may be amenable to the "growth expectations" analysis immediately above), it also seems likely to encompass a set of low-quality firms that will (but have not yet) failed. If many low-quality small firms register voluntarily and "pool" with quadrant (ii) and (iv) firms, signaling will fail because it will not have sufficiently reliable informational content.

The response to this objection appeals to the dynamics of signaling over time. Loss firms, unless they are able to move into a profitable position within a reasonable amount of time, will be unable to sustain themselves. They may register in response to the cash incentive of an input tax refund, but on a net basis, this will only improve their economic position if it is greater than their cost of registering. Where this is the case, their business model is unlikely to be sustainable. Unless they move into profitability, they can be expected to drop out of the population of observable firms. In equilibrium, especially in higher-threshold jurisdictions, the empirical significance of these loss firms may be sufficiently small as to preserve the value of the signal. Even in low-threshold jurisdictions, there is some evidence that loss firms are reluctant to register voluntarily and may leave significant cash input tax credits on the table. Depending on the empirical significance of these small loss firms

and how quickly they fail relative to the overall population of small firms, signaling can be preserved if those that voluntarily register are high-quality firms that are only temporarily described by quadrant (iii) and possess the private information to know that they will soon be better described by quadrant (i). For those that are destined for failure (which, I will assume, is the paradigmatic example of low quality), signaling requires that few take the leap of registering.

D. Summary of the model's applicability

This Part has argued that, under certain circumstances, voluntary VAT registration is likely to meet the requirements of Spence's costly signaling model. Further, the standard model of voluntary registration—formality chain effects—and the signaling account are consistent and mutually reinforcing. Voluntary registration offers a small firm the possibility of "looking big" or, alternatively, looking like a firm that enjoys the benefit of formality chain effects. It therefore offers a way to avoid the stigma of smallness and informality. This gives the signaling story intuitive appeal.

But the core insight of Spence's signaling model is that small firms are unlikely to avoid this stigma at any cost, and thus the circumstances under which they take on the cost of avoiding the stigma may communicate valuable information, across two differentiated groups of small firms. First, for the subset of small firms for which the formality chain effect is *not* present (quadrants (ii) and (iv)), registration is absolutely costly. Second, for the small firms with potential benefits from formality chain effects, such benefits will materialize only to the extent that they are larger than the compliance costs of registering. Put differently, the existence of formality chain effects implies an upper bound on a given small firm's net costs of voluntarily registering. Thus, taking the perspective of a small firm's suppliers or customers, one begins to see how any reluctance on the part of the small firm to register voluntarily might be construed as a signal of low quality. In this way, the two models—formality chain effects and signaling—reinforce rather than undercut one another.

Part V: Conclusion

The signaling account developed in this paper implies that offering small firms the ability to opt in to a VAT through voluntary registration can help resolve information asymmetries that may be particularly likely to affect small and micro-businesses, and that signaling complements rather than conflicts with the standard formality chain effects model. But why might a signaling account of voluntary registration matter for VAT policymakers?

Any speculation about an answer depends heavily on whether the signaling that takes place is welfare-reducing or welfare-enhancing. With respect to the former, it is difficult to rule out the conclusion that signaling in this context may decrease social welfare. This could occur if there are less-costly non-VAT-related signaling mechanisms that small firms and their counterparties might gravitate towards in the absence of voluntary registration. Candidates include product marketing, packaging, location, and other costly actions that could work as signals of firm quality. In such a welfare-reducing scenario, one policy implication might be to abandon voluntary registration

entirely, and permit a firm to register for the VAT only after its sales exceed the registration threshold.

On the other hand, in a setting characterized by asymmetric information, small firms and their counterparties that have access to voluntary registration may be better off than they would be without the costly action. This is because signaling may assist in avoiding a "lemons" problem in which counterparties cannot differentiate high-quality small firms from low-quality small firms.   In particular, signaling could prevent an unraveling scenario in which high-quality small firms are forced out of the market, leaving only low-quality small firms. Even under less dramatic circumstances, a signaling role for voluntary registration may imply a more efficient matching of small firms with counterparties. In such a welfare-enhancing scenario, the existence of signaling improves resource allocation and facilitates gains from trade that might not otherwise be realized.

In the remaining discussion, I assume that signaling is welfare-enhancing, and speculate about the tentative implications of signaling for the key VAT policy parameter that affects small firms: the level of the registration threshold.[93] First, if signaling is viewed in isolation (that is, other factors that influence the setting of a VAT registration threshold are ignored) and the phenomenon of signaling is found to be on-balance welfare-increasing, its presence counsels against having no registration threshold at all. This is because there can be no signaling if all firms are required to register from the first dollar (except perhaps through outright evasion, which is always an available alternative, albeit a socially undesirable one). While zero-dollar thresholds are atypical, the typical approach for setting a registration threshold optimally emphasizes two potentially efficiency-maximizing equilibria: a very high threshold or a very low one.[94]   Therefore, the signaling account may offer—at least until technological developments reduce VAT compliance and administration costs for small firms to near-zero levels—a new reason that policymakers might prefer the very high-threshold equilibrium to the very-low one.

The second conclusion engages more granularly with the question of how signaling might affect a policymaker's analysis of the optimal registration threshold. This is because signaling relies on the level of the registration threshold being set more or less "correctly." What does this mean? In the signaling context, "correctly" means that the threshold is set such that it induces separation between high-quality small firms (as they voluntarily register) and low-quality small firms (as they remain exempt). If the threshold is set too low, too few firms will have access to the signal, because they will be required to register. If the threshold is set too high, many firms will have access to the signal, but it may be so high as to be "out of reach" even for some high-quality firms. Such firms may take a wait-and-see approach (particularly with regard to their expectations for growth) rather than investing in voluntary registration, thereby compromising the informational benefits of and resource allocation gains from signaling.[95]

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[93] The consensus model for setting an optimal registration threshold does not incorporate voluntary registration. See Keen and Mintz, supra note 37, at 574 (third caveat in conclusion). Liu and Lockwood also do not model how formality chain effects through the "traditional" channels—input and customer—may impact the analysis of a threshold. See Liu and Lockwood, supra note 34, at 1-5.

[94] See Keen and Mintz, supra note 37, at 569.

[95] Id. at 568-72 (showing an outsized role for firm-size distortions at the notch; "as the threshold is

But it is not at all clear how a threshold that is "correct" in the context of the signaling account matches up with or diverges from a threshold that is "correct" in that it maximizes production efficiency, minimizes compliance and administration/enforcement costs, and while also minimizing revenue leakage according to the optimal threshold model.[96] The reason for this is simple: to remain tractable, the optimal threshold model doesn't directly analyze voluntary registration.

Nonetheless, to the extent that a given VAT jurisdiction's registration threshold has been set as optimally as possible on the basis of factors other than signaling, emerging evidence of signaling may indicate that the threshold should be set slightly *higher* than it would be otherwise. All else equal, the signaling channel will *increase* the ranks of the population of voluntarily registered small firms, which may impose public costs that are not privately internalized absent government intervention. In particular, such costs are generated by the marginal voluntary registrant that demands public administration and enforcement resources from the public taxing agency. Calibrating upward the threshold is the most obvious route by which the public costs of signaling could be internalized into the private "price" of voluntary registration facing small firms.

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increased, those constraining their sales to keep just below the threshold find it desirable to expand output").

[96] Id. The basic intuition behind Keen and Mintz's high-threshold recommendation is that a high threshold minimizes efficiency losses from firm-size distortions by ensuring that only the largest firms are in the vicinity of the threshold. Put differently, the output-distorting notch represented by the registration threshold is simply out of reach for the majority of firms. This results in greater competitive fairness (horizontal equity) across firms of similar sizes while (i) saving substantial government administration and enforcement costs and (ii) compromising little VAT revenue net of such costs.