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Trade Policy Uncertainty, Financial Frictions, and the Sources of Export Hysteresis

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Abstract

Firms that could profitably export often do not, and firms that stop exporting often fail to return when conditions improve. Two literatures explain this hysteresis through different frictions. The real options literature holds that entry is irreversible and that uncertainty about future trade policy creates an option value of waiting, so firms delay entry even when current expected profits are positive. The financial frictions literature holds that entry requires sunk expenditure that constrained firms cannot fund, so they do not enter regardless of what they expect. The two produce observationally similar reduced forms, and empirical work has often been unable to separate them. This article argues that the failure to separate them has consequences, because the implied remedies are not merely different but are frequently treated as substitutes when they are complements. Binding trade agreements address uncertainty and do nothing for a firm that cannot raise the entry capital. Trade finance facilities address constraints and do nothing for a firm that is rationally waiting. The article's central claim is that the two frictions compound rather than add: uncertainty raises the return a lender requires on sunk-cost lending, tightening the constraint, while the constraint removes the firm's ability to exercise its option when uncertainty resolves favourably, so the option becomes worthless precisely when it should pay off. Under this reading, the standard practice of estimating one channel while treating the other as background does not merely omit a term. It biases the estimated magnitude of whichever channel is measured, in a direction that depends on the correlation between policy volatility and financial development across the sample. The article specifies the evidence that would separate the channels, argues that most of it already exists in unlinked datasets, and draws out the policy consequences of continued conflation.

Keywords: - Trade Policy Uncertainty, Real Options, Sunk Entry Costs, Export Hysteresis, Credit Constraints, Trade Finance, Trade Agreements, Firm Dynamics.

I. INTRODUCTION

The decision to export is not a decision about this year's profits. It is an investment. Establishing a distribution network, meeting foreign regulatory standards, adapting products, and building buyer relationships all require expenditure that is sunk before any revenue arrives, and the evidence that these costs are large and that they generate persistence in export status is among the most robust in the firm-level trade literature (Das et al., 2007; Roberts & Tybout, 1997). Once entry is understood as investment under irreversibility, two classical results follow immediately, and they have generated two largely separate research programmes.

The first is that irreversibility plus uncertainty generates an option value of waiting. A firm facing an uncertain future policy environment will rationally decline an investment with positive expected net present value, because delaying preserves the option to invest after learning more, and that option has value the standard net present value calculation ignores (Bernanke, 1983; Dixit, 1989). Applied to trade, this predicts that the mere possibility of future protection suppresses entry even when current tariffs are low, and that removing the possibility is valuable independently of removing the tariff (Handley, 2014; Handley & Limão, 2017). The empirical payoff has been substantial: the reduction in the threat of a trade war following China's

accession to the World Trade Organization accounts for more than a third of Chinese export growth to the United States between 2000 and 2005, and delivered a welfare gain to United States consumers equivalent to a permanent tariff reduction of 13 percentage points (Handley & Limão, 2017).

The second result is that sunk costs must be financed. A firm that cannot borrow against future export profits will not enter, whatever its expectations, and the friction operates on both the extensive and intensive margins of trade (Manova, 2013; Melitz, 2003). This literature has established that financially developed economies acquire comparative advantage in sectors dependent on external finance, that credit conditions shaped the pattern of the 2008 to 2009 trade collapse across financially vulnerable sectors (Chor & Manova, 2012), and that shocks to the supply of trade-specific financial instruments reduce exports to affected destinations (Niepmann & Schmidt-Eisenlohr, 2017).

Both literatures explain the same phenomenon: too little export entry relative to what a frictionless model predicts, and persistence in whoever happens to be exporting already. Both generate the same broad empirical signature, namely muted responsiveness of entry to current profitability. And both have been estimated largely in isolation, with the other friction relegated to a control variable or to a sentence in the limitations.

This article argues that the separation is no longer defensible, for a reason more consequential than tidiness. The two frictions are not additive. Section 6 sets out the argument in full, but the intuition is short. A lender asked to finance sunk, non-collateralisable entry expenditure faces the same irreversibility the firm does, and prices the same uncertainty. Higher policy uncertainty therefore tightens the financing constraint at the same moment that it raises the option value of waiting. Conversely, a firm that is credit-constrained cannot exercise its option when uncertainty resolves favourably, which strips the option of the value that justified waiting in the first place. Each friction amplifies the other, and estimating either in isolation attributes part of the interaction to whichever is being measured.

The stakes are practical. Trade agreements are, on the option-value reading, valuable primarily because they bind policy and remove the tail of protection, which is why they can deliver welfare gains far exceeding their tariff content (Handley & Limão, 2017, 2022). Trade finance facilities are valuable because they relax constraints. Institutions treat these as separate policy tracks addressed by separate bodies. If the frictions compound, the returns to each are increasing in the other, and the sequencing question that neither literature poses becomes the important one.

II. METHOD OF THE REVIEW

The corpus was assembled through a structured search across EconLit, Scopus, Web of Science, RePEc/IDEAS, and SSRN, together with the working paper series of the National Bureau of Economic Research, the Federal Reserve System, and the World Bank. The search combined three term blocks: first, "trade policy uncertainty" OR "policy uncertainty" OR "real option" OR "irreversibility" OR "sunk cost"; second, export OR "export entry" OR "extensive margin" OR "firm dynamics"; third, "credit constraint" OR "financial friction" OR "trade finance" OR "external finance dependence". The first two blocks were required conjunctively. The third delimited the financial-frictions sub-corpus and, separately, was combined with the first two to identify the small set of studies attempting joint treatment.

The window ran from 1983 to 2026, beginning with Bernanke (1983) because that paper established the irreversibility result on which the entire option-value branch depends. Inclusion required peer-reviewed publication or circulation in a recognised institutional series, together with an identified mechanism operating on export participation or volumes. Studies of uncertainty and domestic investment were included only where the mechanism transfers directly to export entry, since the general uncertainty literature is far too large to review here and is well surveyed elsewhere (Bloom, 2014).

Because the argument of this article concerns the interaction of two mechanisms rather than the magnitude of either, no effect-size pooling was attempted. Pooling would be actively misleading in this setting: if the interaction argued for in Section 6 exists, then estimates of each channel are contaminated by the other in sample-specific ways, and averaging contaminated estimates produces a more precise contaminated estimate rather than a cleaner one.

III. TWO THEORIES OF THE SAME FACT

3.1. Hysteresis as a Stylised Fact

Export status is highly persistent. Firms that exported last year are overwhelmingly likely to export this year, and entry and exit rates are far lower than variation in profitability would imply under frictionless entry. Structural estimation of entry costs from Colombian data confirms that sunk costs are large, that they generate the observed persistence, and that they imply substantial heterogeneity in which firms respond to any given incentive (Das et al., 2007; Roberts & Tybout, 1997). The classic macroeconomic version of the same observation is that large exchange rate movements leave permanent traces on trade patterns, because entrants who sank costs during an episode do not exit when it reverses (Baldwin & Krugman, 1989). Any adequate theory must explain both the low entry rate and the failure to exit, and both candidate theories do.

3.2. The Real Options Account

Under irreversibility, the decision to invest is the decision to kill an option. The firm should invest only when expected profit exceeds the direct cost plus the value of the option surrendered, and that option value rises with the volatility of the underlying process (Bernanke, 1983; Dixit, 1989). Uncertainty therefore suppresses investment even when it is mean-preserving, and it does so most powerfully where irreversibility is greatest. Aggregate uncertainty shocks produce sharp contractions in activity through exactly this channel, along with a subsequent overshoot as pent-up decisions are executed (Bloom, 2009).

The trade application is direct. Handley (2014) formalises export entry under trade policy uncertainty and shows that binding tariff commitments raise entry even when applied tariffs are unchanged, because they truncate the distribution of future protection. Handley and Limão (2017) embed this in general equilibrium and quantify it. The mechanism explains a puzzle that tariff-level analysis cannot: why accession to a trade agreement produces trade growth out of proportion to the tariff changes it delivers, and why the value of an agreement lies substantially in what it forecloses rather than in what it currently does.

3.3. The Financial Frictions Account

Under credit constraints, the firm's problem is not option value but liquidity. Sunk entry expenditure is largely non-collateralisable, being composed of market research, relationship formation, and regulatory compliance rather than tangible assets, which makes it exactly the sort of expenditure external finance is least willing to fund. Firms below a wealth or pledgeable-income threshold therefore do not enter regardless of expectations, and the resulting selection is on financial capacity rather than on productivity alone (Manova, 2013; Melitz, 2003).

The empirical support is extensive and is reviewed in Section 5. What matters here is the structural point: this account also generates low entry, high persistence, and muted responsiveness to profitability, because the constrained firm's entry decision is insensitive to expected profit over the relevant range. The two theories are observationally close by construction.

3.4. Where they diverge

Three divergences are exploitable.

- Response to mean-preserving spreads. The option-value account predicts that a mean-preserving increase in policy volatility suppresses entry. The pure credit-constraint account predicts no effect, since expected profitability is unchanged and the constraint binds on the level of required funds rather than on their variance. This is the cleanest theoretical separation available.
- Response to resolution. When uncertainty resolves favourably, the option-value account predicts a burst of delayed entry, the overshoot documented in the aggregate uncertainty literature (Bloom, 2009). The credit-constraint account predicts no such burst, because the constrained firm was never waiting.
- Cross-sectional incidence. Option value should bind hardest where irreversibility is greatest, which correlates with relationship specificity and product adaptation intensity. Constraints should bind hardest where firms are small, young, and low in tangible assets, and where the domestic financial system is shallow (Beck et al., 2005). These correlates are distinct, though not orthogonal.

IV. EVIDENCE ON THE UNCERTAINTY CHANNEL

4.1. Measurement

Progress in this literature followed measurement. Newspaper-based indices of economic policy uncertainty made the concept operational at the macroeconomic level (Baker et al., 2016), and trade-specific measures followed, constructed from newspaper coverage, from firms' earnings conference calls, and from the structure of tariff commitments themselves (Caldara et al., 2020). The earnings-call measure is particularly useful for the argument of this article, because it varies at firm level and therefore permits interaction with firm financial characteristics, which aggregate indices cannot support.

4.2. Magnitudes

The estimated effects are large. Trade policy uncertainty reduced United States business investment by approximately 1.5 percent in 2018, with effects identified in both firm-level and aggregate data and rationalised through a two-country general equilibrium model with export participation decisions (Caldara et al., 2020). The China accession estimates, cited in Section 1, imply that uncertainty reduction accounted for over a third of a major export boom (Handley & Limão, 2017). Brexit provides a further natural experiment in which uncertainty alone, absent any tariff change, depressed trade, with effects extending beyond the directly affected pair (Graziano et al., 2021).

The realised-tariff literature supplies the counterpoint that makes these magnitudes interpretable. The 2018 and 2019 tariff episode produced near-complete pass-through to domestic prices, with substantial aggregate welfare losses (Amiti et al., 2019; Fajgelbaum et al., 2020), and generated global reallocation of trade flows towards third countries (Fajgelbaum et al., 2024). Comparing the uncertainty estimates to the realised-tariff estimates shows that the anticipation of protection can cost a comparable order of magnitude to protection itself, which is the central policy claim of the uncertainty programme and is reviewed in full by Handley and Limão (2022).

4.3. What this Literature Does Not Do

With few exceptions it does not condition on financial capacity. Firms are heterogeneous in productivity in these models, and increasingly in export participation status, but they are not heterogeneous in their ability to fund entry. The representative firm in an option-value model can always execute when it decides to. Since the models assume away the constraint, the estimates cannot speak to its interaction with uncertainty, and any such interaction present in the data is absorbed into the estimated uncertainty coefficient.

5. EVIDENCE ON THE FINANCIAL CHANNEL

5.1. Constraints and the Pattern of Trade

Credit constraints shape both the volume and the composition of trade. Financially developed countries hold comparative advantage in financially vulnerable sectors, and constraints operate on entry as well as on scale (Manova, 2013). Firm size and age are strong predictors of financing and legal obstacles to growth, which is the structural reason small firms are systematically under-represented among exporters (Beck et al., 2005). During the 2008 to 2009 collapse, countries facing tighter credit conditions exported less, with the effect concentrated in sectors requiring extensive external finance, holding few collateralisable assets, or lacking access to trade credit (Chor & Manova, 2012).

5.2. Trade-Specific Finance

Trade has its own financial instruments, and their supply is neither elastic nor evenly distributed. Payment terms are chosen jointly with financing arrangements and substitute for weak contract enforcement, with cash-in-advance dominating in weakly enforcing destinations and terms relaxing as relationships mature (Antràs & Foley, 2015; Schmidt-Eisenlohr, 2013). The supply of bank guarantees is concentrated and geographically specialised, so that shocks to individual banks propagate to corridor-level trade: a one standard deviation negative shock to a destination's letter-of-credit supply reduces exports to that destination by approximately 1.5 percentage points, an effect concentrated in small and thinly banked destinations and more than doubling in crisis conditions (Niepmann & Schmidt-Eisenlohr, 2017).

That last figure deserves emphasis alongside the 1.5 percent investment effect of trade policy uncertainty reported in Section 4.2. The two are not directly comparable in units, but they are comparable in the sense that matters here: neither is a rounding error, and any framework that treats one as first-order and the other as background is making an assumption rather than reporting a finding.

5.3. What this Literature does not do

Symmetrically, it does not model the option value of waiting. Constrained firms in these models want to enter and cannot. The possibility that an unconstrained firm might decline to enter because the policy environment is volatile does not arise, and where entry fails to respond to a relaxation of constraints, the residual is typically attributed to unmeasured fixed costs rather than to rational delay.

VI. WHY THE FRICTIONS COMPOUND

6.1. The Lender holds an Option too

The core of the argument is that irreversibility is a property of the expenditure, not of the borrower, and it is therefore priced by whoever bears the risk. A bank asked to lend against sunk export entry costs is financing an asset with negligible liquidation value in a market whose future access is uncertain. Higher trade policy uncertainty raises the variance of the borrower's future cash flows, raises the probability of the states in which the loan is not repaid, and does so for an exposure that cannot be recovered through collateral. The lender's required return rises accordingly.

This is the general mechanism by which uncertainty and financial frictions interact in the investment literature, where uncertainty shocks amplify through credit spreads rather than operating solely through the firm's own option calculus (Arellano et al., 2019; Gilchrist et al., 2014). Its application to export entry is direct and, so far as this review can establish, has not been made explicitly. The consequence is that the financing constraint on export entry is not a fixed parameter of the financial system. It tightens when policy becomes volatile, which is precisely when the option-value literature says entry should fall for independent reasons.

6.2. The Constrained Firm's Option is Worth Less

The reverse interaction is equally direct and, if anything, sharper. The option-value logic assumes the firm can exercise when it chooses. A credit-constrained firm cannot. When uncertainty resolves favourably and the moment to enter arrives, the constrained firm faces the same funding problem it faced before, and the option it was preserving turns out to have been unexercisable.

This has an implication that neither literature states. For a constrained firm, waiting is not optimal delay; it is simply exclusion described in the vocabulary of choice. The observed "delay" of such firms should not be counted as evidence for the option-value mechanism, yet in aggregate or country-level data it is indistinguishable from it. Where financially constrained firms are numerous, which is to say in most developing economies, estimates of the uncertainty channel will absorb a portion of the constraint channel.

6.3. The Direction of the Resulting Bias

The bias is not sign-ambiguous once the sample is specified. In a sample of countries or firms where policy volatility is positively correlated with financial underdevelopment, which describes the typical developing-country cross-section, an estimate of the uncertainty channel that omits financial capacity will be biased away from zero, because part of what is attributed to rational waiting is inability to move. Symmetrically, an estimate of the constraint channel that omits uncertainty will be biased away from zero in the same samples, because part of what is attributed to constraints is rational waiting by unconstrained firms. The two literatures therefore each overstate their own mechanism in exactly the settings where the policy

stakes are highest, and their estimates cannot be added together to produce a total, since doing so would double-count the interaction.

6.4. Summary of the corpus

Table 1. Principal evidence by channel and by treatment of the other friction.

Study	Primary channel	Level of evidence	Treatment of the other friction	Headline magnitude
Handley and Limão (2017)	Uncertainty	Firm entry in general equilibrium; China to United States	Not modelled	Over one-third of 2000 to 2005 export growth; welfare gain equal to 13 percentage point permanent tariff cut
Handley (2014)	Uncertainty	Firm-level export entry	Not modelled	Binding commitments raise entry with applied tariffs unchanged
Caldara et al. (2020)	Uncertainty	Firm-level and aggregate United States	Not modelled	Investment reduced by about 1.5 percent in 2018
Graziano et al. (2021)	Uncertainty	Bilateral trade around Brexit referendum	Not modelled	Trade depressed absent any tariff change
Manova (2013)	Financial	Country-sector trade patterns	Uncertainty not modelled	Credit constraints affect both margins; financial development confers comparative advantage
Chor and Manova (2012)	Financial	Country-sector monthly United States imports	Uncertainty not modelled	Tighter credit reduced exports, concentrated in financially vulnerable sectors
Niepmann and Schmidt-Eisenlohr (2017)	Financial (instrument supply)	Bank-corridor	Uncertainty not modelled	One standard deviation letter-of-credit supply shock reduces exports by about 1.5 percentage points
Das et al. (2007)	Sunk costs, neither friction isolated	Structural, Colombian plants	Both implicit in estimated entry cost	Entry costs large enough to generate observed persistence

The final column of Table 1 is the point of the table. Across the corpus, the friction not being studied is not controlled for imperfectly. It is absent from the model.

VII. WHAT WOULD SEPARATE THEM

The separation is achievable with data that largely exist but have not been linked.

7.1. Interact Firm-Level Uncertainty with Firm-Level Financial Capacity

The earnings-call measure of trade policy uncertainty varies across firms and over time (Caldara et al., 2020), and standard measures of financial constraint are available for the same firms. The interaction term is the object of interest, and its sign tests Section 6.1 directly. A negative interaction, meaning that uncertainty depresses entry more among constrained firms, is evidence of compounding; a positive interaction would suggest the frictions are substitutes, since a firm that cannot move is unaffected by the volatility of what it cannot do.

7.2. Exploit Resolution Events

Section 3.4 identified the burst of delayed entry following favourable resolution as a signature unique to the option-value mechanism. Comparing that burst across firms of differing financial capacity is a direct test of Section 6.2: if constrained firms fail to participate in the post-resolution entry surge, their prior inaction was exclusion rather than delay.

7.3. Use Mean-Preserving Variation

. The sharpest theoretical separation is that pure credit constraints should be insensitive to mean-preserving spreads in policy. Episodes that raise policy variance without shifting expected protection, of which the tariff-binding literature supplies several, therefore identify the option-value channel alone.

7.4. Link Credit Registry Data To Policy Uncertainty Exposure

Whether lenders reprice sunk-cost lending when trade policy uncertainty rises is the empirical content of Section 6.1 and is directly testable in matched bank-firm data, using the sectoral variation in exposure to threatened trade measures as the source of identification. None of this requires new data collection on a large scale. It requires linking datasets that currently sit in different literatures.

VIII. WHAT THE EVIDENCE CANNOT CURRENTLY SETTLE

8.1. Measurement Asymmetry

Trade policy uncertainty is measured with considerable sophistication at firm level; financial constraint is typically proxied by size, age, or tangibility, which are noisy and correlated with productivity. Any interaction estimate will therefore be attenuated on the financial side, biasing tests of Section 6 towards finding no interaction.

8.2. Endogeneity of Exposure

Firms choose which markets to serve and therefore which policy risks to bear, and constrained firms may select into stable markets for that reason. This selection generates a correlation between constraint and low uncertainty exposure that is the reverse of the compounding mechanism and could mask it.

8.3. Geographic Coverage

Both literatures draw disproportionately on data from the United States, Europe, and a small number of middle-income economies with usable registries. The settings where compounding should be strongest, namely economies with volatile trade policy and shallow financial systems, are the least represented.

8.4. Aggregation

Firm-level compounding need not aggregate, since exit of constrained firms reallocates market share to unconstrained ones. Whether the interaction survives aggregation is a quantitative question requiring a model, and no such model currently incorporates both frictions.

8.5. The Current Episode

The tariff environment since 2025 combines high realised tariffs with high uncertainty about their persistence, and its effects are unfolding within a broader reorganisation of trade along geopolitical lines (Aiyar et al., 2023; Alfaro & Chor, 2023). Whether firms are waiting, are unable to move, or are relocating is precisely the question this article says the literature cannot currently answer, and it is being asked in real time.

IX. POLICY IMPLICATIONS

9.1. Trade Agreements do more than Cut Tariffs, But not for Everyone

The option-value case for binding commitments is strong and quantitatively large (Handley, 2014; Handley & Limão, 2017, 2022). But its benefit accrues to firms positioned to respond when the tail risk is removed. For constrained firms, an agreement removes a risk they were not principally deterred by. Evaluations of agreements that assume a uniform entry response will overstate their inclusiveness even where they correctly estimate their aggregate effect.

9.2. Trade Finance Facilities are Worth more when Policy Is Volatile

If Section 6.1 is right, the cost of financing export entry rises with policy uncertainty, which means the marginal value of a public guarantee or risk-sharing facility is highest exactly when uncertainty is highest. Current practice, which sizes such facilities against structural gap estimates, does not index them to the policy environment. It should.

9.3. The Two Instruments are Complements

This is the practical payoff of the argument. An agreement without financing capacity leaves constrained firms where they were; financing capacity without an agreement funds entry into a market that may be closed by policy next year. Institutions currently treat trade negotiation and trade finance as separate mandates handled by separate bodies. If the frictions compound, the returns to each are increasing in the other, and coordination is not administrative tidiness but a first-order design question.

9.4. Uncertainty is a Policy Variable, not a State Of Nature

The distinction matters for how governments account for their own actions. The evidence that anticipation of protection is costly on an order comparable to protection itself (Caldara et al., 2020; Handley & Limão, 2017), set against the documented costs of realised tariffs (Amiti et al., 2019; Fajgelbaum et al., 2020, 2024), implies that the manner in which trade policy is announced, sequenced, and committed to is itself an economic instrument with measurable consequences.

X. CONCLUSION

Export hysteresis has two credible explanations, and the field has largely proceeded as though it had one at a time. Firms may be waiting, in which case volatility is the enemy and binding commitments are the remedy. Or they may be unable to move, in which case expectations are beside the point and financing is the remedy. The reduced forms are similar enough that either literature can account for the aggregate facts, which is precisely why each has been able to develop without confronting the other.

This article has argued that the frictions interact multiplicatively, through two channels that run in opposite directions and reinforce the same conclusion. Lenders price irreversibility too, so uncertainty tightens the constraint. And constrained

firms cannot exercise, so the constraint hollows out the option. The consequence is that estimates of each channel absorb part of the other, in a direction that is predictable once the sample is specified, and that the two cannot be summed to a total.

What follows is not primarily a call for better estimates, though better estimates would help and Section 7 describes how to obtain them from data already collected. It is a claim about policy architecture. The institutions that reduce trade policy uncertainty and the institutions that finance trade are treated as addressing separate problems. On the reading advanced here they are addressing two halves of one problem, and each is worth more when the other is present. That is a proposition the existing evidence neither establishes nor refutes, which is an unsatisfactory place for a question of this size to rest.

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