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The births, lives, and deaths of corporations in late Imperial Russia

BOFIT Discussion Papers, No. 26/2020

Provided in Cooperation with:
Bank of Finland, Helsinki

Suggested Citation: Gregg, Amanda; Nafziger, Steven (2020) : The births, lives, and deaths of corporations in late Imperial Russia, BOFIT Discussion Papers, No. 26/2020, ISBN 978-952-323-356-0, Bank of Finland, Institute for Economies in Transition (BOFIT), Helsinki, https://nbn-resolving.de/urn:nbn:fi:bof-202012142558

This Version is available at:
https://hdl.handle.net/10419/240377

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BOFIT Discussion Papers
26 • 2020

Amanda Gregg and Steven Nafziger

The births, lives, and deaths of corporations in late Imperial Russia

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BOFIT Discussion Papers
Editor-in-Chief Zuzana Fungáčová

BOFIT Discussion Papers 26/2020
10.12.2020

Amanda Gregg and Steven Nafziger: The births, lives, and deaths of corporations in late Imperial Russia

ISBN 978-952-323-356-0, online
ISSN 1456-5889, online

The views expressed in this paper are those of the authors and
do not necessarily represent the views of the Bank of Finland.

Suomen Pankki
Helsinki 2020

Contents

Amanda Gregg and Steven Nafziger

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Abstract

Enterprise creation, destruction, and evolution support the transition to modern economic growth, yet these processes are poorly understood in industrializing contexts. We investigate Imperial Russia's industrial development at the firm-level by examining entry, exit, and persistence of corporations. Relying on newly developed balance sheet panel data from every active Russian corporation (N > 2500) between 1899 and 1914, we examine the characteristics of entering and exiting corporations, how new entrants evolved, and the impact of founder identity on subsequent outcomes. Russian corporations operated flexibly and competitively, conditional on overcoming distortionary institutional barriers to entry that slowed the emergence of these leading firms in the Imperial economy.

Keywords: entry and exit, firm dynamics, Imperial Russia, corporations, industrialization
JEL Codes: L11, N13, N63, 014, 016

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Acknowledgements
We are incredibly grateful for comments from colleagues and audiences at the World Business History Congress (Bergen), Yale, Queens University, Colby, Harvard, Stanford, Binghamton, University of Montreal, the Washington Area Economic History Seminar, the Central New York Economic History meeting, the Association for Slavic, East European, and Eurasian Studies, the Economic and Business History Association Meeting, the NBER Entrepreneurship Working Group meetings, the All-UC Economic History conference, the Wisconsin Russian Historical Political Economy workshop, the University of Helsinki, the Bank of Finland Institute for Economies in Transition, Middlebury, and Williams. Giulia Filocca, Tamar Matiashvili, Madeline McFarland, Sanket Vadlamani, and Brenda Xu provided exemplary research assistance. We greatly appreciate the aid with sources provided by librarians at Harvard, Middlebury, Williams, and the National Library of Finland. Financial support was provided by Middlebury, Williams, and the National Science Foundation (SES #s 1658877 and 1658887).

I Introduction

Firm entry, evolution, and exit are key attributes of an economy's overall performance,[1] yet very little is known about these processes in historical settings. While the cross-sectional size distribution of establishments has been well documented in the United States and other leading economies over the long 19th century, the dynamics of how size and structure evolved at the firm level are largely unknown outside of a few industries. Furthermore, any understanding of the early stages of modern economic growth must grapple with the "late-industrializers," where firms may have faced institutional obstacles or market imperfections that distorted firm entry, growth, and exit, possibly delaying the adoption of new industrial technologies, financial structures, and competitive strategies. This paper makes substantial advances in this direction by studying the births, deaths, and lives of corporations in late Imperial Russia, perhaps the quintessential late-industrializing economy.

Imperial Russian corporations faced high barriers to entry, because the government maintained a costly system of incorporation by special concession. This key distortion constrained capital investment and firm growth by reducing the number of companies that could benefit from the limited liability and easier access to capital markets that incorporation offered (Gregg 2020). While Gregg (2020) examines the causal effects of this concession system by comparing corporate and non-corporate manufacturing establishments, this paper, rather than examining all firms, takes advantage of new and highly detailed data on corporations to document and analyze the characteristics and life-cycle dynamics of the industrial firms that did incorporate. What were the features of Imperial Russian firms at the time of incorporation? How did corporations evolve after entry? And what attributes of corporations were associated with exit? To address these questions, we utilize published balance sheet and corporate charter information for all active industrial corporations from 1900 and 1914. This panel dataset of over 2,500 corporations presents a unique opportunity to analyze early industrial development in the face of apparent institutional constraints.

Using these data, we estimate entry and exit rates (defined below) for Imperial Russian corporations. In the absence of similar data from other historical settings, Table 1 reports the overall calculated rates for our Russian sample in comparison to similar rates in modern settings, defined across different units of analysis. Our takeaway is that the rates of entry and exit of Imperial Russian corporations during this period of early industrial takeoff – 11.8% and 5.7% – are in line with those seen in the mature modern economies of the United States and European Union, while perhaps slightly below those in faster growing emerging markets such as China and Turkey. This implies a substantial amount of firm churning, suggesting that there were at least some competitive pressures

[1] See, for example, Haltiwanger, Jarmin, and Miranda (2013), who highlight the important role of entry for creating new job opportunities, or the discussion of turnover in developing countries in Tybout (2000).

within the corporate sector. However, entry (and presumably exit) rates may very well have been higher under more general incorporation, with possible consequences for resource allocation and industrial growth.

While our data do not allow us to directly investigate a counterfactual without entry barriers, we undertake a series of empirical exercises that shed light on consequences of the concession system of incorporation. Our data reveal that Imperial Russian corporations evolved in ways that can be rationalized with standard insights from the literature on firm life-cycle dynamics: new corporations, especially ones that did not previously exist as partnerships, were weaker upon entry and more likely to exit the data; these new firms grew rapidly in terms of revenue and market share, becoming indistinguishable from incumbents relatively quickly; and measures of corporate performance like profitability strongly and negatively predicted exit.

However, our investigations of political connections and business cycles reveal the specifically Russian concession system's effects on the corporate sector. First, corporations with political connected founders entered the corporate sector with observably weaker characteristics, but such firms were no more likely to exit after founding. Second, corporate entry was unrelated to the Imperial business cycle, suggesting that the time-consuming process of incorporation did impose real constraints on firm decisions. Thus, though we find evidence that the Imperial corporate sector was relatively flexible and competitive, legal impediments to incorporation distorted the characteristics and behavior of corporations in important ways.

Our paper's firm-level examination of entry and exit dynamics speaks to a longstanding debate on the trajectory of the Russian economy before the Revolution. One side (e.g., Gregory,1982; and Markevich and Nafziger, 2017) stresses fairly high rates of industrial growth, characterizing the late Imperial economy as relatively dynamic. However, Allen (2003), Cheremukhin et al. (2017), and Owen (1991) assert that significant structural obstacles impeded Russian economic modernization before the Revolution. Practically no empirical work has been undertaken with micro-level data to examine just how institutional and economic conditions impacted firm behavior and outcomes. Exceptions include the recent work by Gregg (2020) and Gregg and Nafziger (2019), who find that firms adopting the corporate form of organization demonstrated flexible financial strategies, leading to greater capital accumulation, investment in new technologies, and growth. Following Owen (1991), these studies suggest that a more flexible and lower-cost process of incorporation would have improved the level and pace of industrial development prior to 1917.

Table 1 Modern evidence on firm entry and exit rates

Country	Years	Unit	Entry rates	Exit rates	Source
Imperial Russia	1900 – 1912	Chartered industrial corporations	11.8%	5.7%	Current paper
US	1978 – 2014	Businesses with paid employees	12.30%	10.70%	BDS, US Census Bureau
	1963 – 1982	Manufacturing plants (5-year periods)	41.4 – 51.8%	41.7 – 50.0%	Dunne et al. (1988)
	1972 – 1997	Manufacturing plants	6.20%	5.50%	Lee and Mukoyama (2015)
Canada	1991 – 2005	Manufacturing plants	2 – 16%	2 – 9%	Liu and Tang (2017)
	2000 – 2008	Private sector businesses	10.80%	9%	Ciobanu and Wang (2012)
UK	1986 – 1991	Manufacturing plants	21%	18.50%	Disney et al. (2003)
China	1998 – 2007	Industrial firms > 5 million yuan in sales	about 20%	18%	He and Yang (2016)
South Africa	2010 – 2014	All formal firms with employees	8%	8%	Tsebe et al. (2018)
Turkey	2006 – 2016	All manufacturing firms	16%	10%	Akcigit et al. (2019)
Cross country	1990s	Manufacturing firms with employees	5 – 23%	5 – 12%	Bartelsman et al. (2009)
	2000 – 2015	Small firms, formal and informal	–	8.30%	McKenzie and Paffhausen (forthcoming)
	1960s – 1980s	Manufacturing firms	6.50%	6.50%	Caves (1998)
	2000 – 2014	Businesses with <10 employees	11.3%	9.4%	Anderton et al. (2019)
	2000 – 2014	Businesses with => 10 employees	1.7%	1.4%	Anderton et al. (2019)

Note: Bartelsman et al. (2009) data cover the Netherlands, Italy, Argentina, Finland, Estonia, Canada, the U.S., Denmark, Portugal, France, Slovenia, Hungary, Romania, the UK, Mexico, Latvia, and Brazil. McKenzie and Paffhausen (forthcoming) utilize firm survey data from Indonesia, Mexico, Nigeria, Thailand, Egypt, Ghana, Kenya, Malawi, Sri Lanka, Uganda, Benin, and Togo. Caves (1998) summarizes data from studies conducted for Belgium, Canada, (West) Germany, South Korea, Norway, Portugal, the UK, and the U.S. Anderton et al. (2019) utilizes a business demographic database covering all 28 EU countries. The entry and exit rates for Imperial Russia are the overall averages reported in Table 4.

The 19th-century spread of modern industrialization was accompanied by growing capital requirements. Firms increasingly adopted corporate or limited liability forms of partnerships to ease access to financing such larger scale investments. Changes to legal and regulatory regimes enabled flexible and long-lived forms of firm organization that lowered capital costs, streamlined internal structures, shielded assets, and embedded limited liability. This was the case in the United States, Britain, Germany, and other industrial leaders, but it was also true in Imperial Russia. Most existing historical work on industry, firm, and market dynamics during this period has naturally focused on establishments (plants or firms) and on the "real side" of the enterprise: output, employment, capital utilization, and productivity (e.g. Atack et al. 2008, Sokoloff 1984). Corporations, as an important sub-set of all firms, have received considerable attention from historians, though much of this research is non-quantitative or focuses primarily on governance or financial matters rather than on real outcomes (e.g., Braggion and Moore 2013, Fohlin 2007, Deloof and van Overfelt 2008). Practically no quantitative historical research on firms has focused on an economy as poor as late Imperial Russia (although see Artunc, 2019). This paper aims to bridge these gaps and jointly investigate the microstructure of corporate development in a late-industrializing economy.

The particular features of the Imperial Russian context allow us to make new connections among literatures on the economics of institutions, corporate governance, finance, and industrial organization. Our central focus in this paper is on documenting and analyzing the "life-cycles" of corporations, a topic that has received considerable attention among industrial economists working on the broader category of firms.[2] Classic studies in industrial organization (e.g., Dunne et al. 1988, Haltiwanger et al. 2013) consider the differences between incumbents and brand-new entrants or entrants diversifying into new industries, but little research has examined differences across incumbents, brand-new firms, and those that change enterprise forms, for example, from partnerships to corporations. Our inclusion of both *de novo* and pre-existing (as partnerships or other organizational forms) corporations allow us to study this distinction. Finally, because Imperial Russia possessed two types of corporations that reflected underlying differences in charter provisions, our data also permit a novel examination of variation in life-cycle dynamics among corporations with distinct governance characteristics.

In the following sections we outline the historical and economic context and then introduce and describe our new dataset, a key contribution of our project. Along the way, we specify a set of hypotheses regarding corporate characteristics and life-cycle outcomes. We then evaluate these hy-

[2] Below, we detail our distinction between firms and corporations, especially as to how we interpret the different economic considerations underpinning entry, exit, and life-cycle dynamics.

potheses using a variety of empirical approaches. We conclude with brief remarks on the implications of this paper and our larger project for understanding the early stages of Russian industrial development.

II From historical context to empirical hypotheses

Several features of the historical context are relevant for our examination of Imperial Russian corporate dynamics. One is the macroeconomic environment. According to the national income and business cycle research of Gregory (1982) and Owen (2013), the late Imperial Russian economy experienced a mid-1890s boom followed by a slide into a downturn that reached its nadir in 1901. There was then growth to 1905, a massive contraction with the 1905 Revolution, and a slow and erratic recovery leading up to World War I. While per capita income changed little and the economy remained largely agrarian, Russia's industrial sector did experience the early stages of growth over this period (Kafengauz, 1994).[3] As Table 1 indicates, this time period saw substantial churning in and out of the corporate form. With their clear importance in the overall economy (see below), our focus on these corporations gets at the most dynamic components of early-stage industrial development.

A second relevant area is the industrial organization of Imperial Russia's modernizing sectors. Little work on late Imperial Russian economic development adopts the microeconomic perspective of the firm, and basic facts about the micro-structure of early Russian industrialization remain largely unknown.[4] Tugan-Baranovsky (1970) pioneered an investigation of the transition to modern factory production, which drew upon rich but idiosyncratic data from a very small set of factories in the Moscow region. Various case studies and contemporary accounts have explored the experiences of specific industrial plants (e.g. Markevich and Sokolov, 2005), communities (e.g. Vorderer, 1990), firms (e.g. Grant, 1999), and sectors (e.g. McCaffray, 1996). Only very recently have works such as Gregg (2020) and Kulikov and Kragh (2019) explored larger samples of firms across sectors to better identify the factors underpinning or constraining industrial growth.[5] Despite these advances, empirical evidence on the nature of entry and dynamics of firm survival is practically non-existent. How firms reacted to the incentives of the institutional and policy environment

[3] A long line of scholarship interprets this early Russian industrial development as a consequence of various state initiatives in the economy, from tariffs and the gold standard to the abolition of communal property rights and growing public investment in schooling and infrastructure (Gerschenkron, 1965; Von Laue, 1965).
[4] Gregory (1982), Kafengauz (1993), and contemporary sources such as Varzar and Kafengauz, ed. (1929) do document industry sub-sector level growth between the early 1880s and 1913.
[5] Microdata is crucial for documenting the underlying drivers of firm entry, exit, and survival, which in turn matter for thinking about within- and especially between-firm drivers of aggregate productivity growth and structural change. Micro-level information helps to clarify market structures and the nature of competition within leading and flagging sectors, which can sharpen our understanding of the early stages of industrialization.

regarding entrepreneurial activity, financing, input usage, technology adoption, merger and acquisitions, bankruptcy, and other decisions, and the consequences for competition and sectoral change, has only been explored in a limited and largely qualitative or speculative fashion (e.g. Guroff and Carstensen, eds., 1983; McKay, 1970; Owen, 1991).[6] This paper is a first attempt to rectify this by considering one particular set of modernizing firms: those that incorporated.

A third critical contextual element for our purposes is the Imperial legal environment, especially when it came to corporate law. Following Owen (1991), Gregg (2020) and Gregg and Nafziger (2019) we argue that the absence of general incorporation was a critical impediment to late Imperial economic development. By making incorporation harder, the concession system plausibly raised the costs of financing investment, increased the riskiness of entrepreneurial activities, and limited the planning horizon for firms. The idiosyncratic and ultimately politicized process of chartering a corporation constrained entry into this form, with possible implications for the level of competition, allocation of resources, and pace of industrialization. This interpretation is consistent with the recent work of Cheremukhin et al. (2017), who assert that late Imperial industrialization was slowed by excessive market power in more advanced industries.[7]

However, as we show in Table 1, entry (and exit) rates for Imperial Russian corporations were not substantially out of line with rates in nominally less constrained settings or for more broadly defined units (e.g. establishments or "businesses"). To reconcile these aggregate rates with the prevailing literature on the concession system, a clearer understanding of the dynamic patterns of corporate entry, exit, and survival is invaluable. Moreover, since corporations constituted the primary organizational form in the modernizing sub-sectors of Russian industry (Kulikov and Kragh, 2019), the life-cycle dynamics of this type of firm can speak to the broader features of industrial development.[8] Before presenting our new dataset, we delve deeper into the relevant aspects of the Imperial Russian legal setting. Subsequently, this helps frame a small set of hypotheses drawn from the modern theoretical and empirical literature on firm dynamics, in order to structure our analysis of corporate entry, exit, and survival patterns.

[6] The Imperial financial system is another aspect of the historical context relevant for understanding corporate dynamics. Retained profits, external loans (although more as trade credit than bank loans), bond sales, and equity issues – domestically and abroad – were all financing options available to Russian firms. Incorporation lowered the costs for accessing several of these sources. For much more detail on the financing of Russian industrial corporations, see Gregg and Nafziger (2020).

[7] Imperial Russia's size, ongoing internal market development, and the timing of its industrialization during the "Second Industrial Revolution" might have raised the optimal scale of production. The associated increase in fixed costs would also imply growing barriers to entry. Such developments would have reinforced the possible advantages of the corporate form.

[8] According to Gregg's (2020) calculations, corporations controlled roughly 5% of all industrial establishments, but these plants generated over 40% of industrial revenue over the period 1894-1908.

II.1 The Imperial Russian concession system: corporate charters and corporation types

Late Imperial entrepreneurs could select one of a small number of organizational forms: sole proprietorship, simple partnerships, and joint-stock corporations. However, Russia failed to introduce either general incorporation or a private (non-corporate) business form that offered complete limited liability (e.g. the PLLC, as defined by Guinnane et al. 2007). Rather, the "concession" system of charter application and approval was a costly process, which possibly limited access to incorporation for some Russian firms (Gregg, 2020), while generating considerable variation in corporate structures and governance for those that made it through.[9] Although the Ministry of Finance provided some guidelines, the bargaining and idiosyncrasies of the corporate approval process, possibly involving bribery and/or political imperatives, meant that the details of the charters differed between otherwise similar firms.[10] This variation – along with whether the corporations were *de novo* entities or restructured versions of pre-existing firms – allow us to explore the implications of different governance structures for outcomes over firm life cycles (also see Gregg and Nafziger, 2019).

Chartered corporations in Imperial Russia self-identified as one of two types indicative of underlying variation in organizational characteristics. When formulating their initial charters, the vast majority of corporations defined themselves as either "A-corporations" or "share partnerships." Although the commercial code did not formally distinguish the two variants in terms of their rights or obligations, these identifications – related as they were to the terminology employed for the equity shares – likely signaled the nature of corporate enterprises to potential investors.[11] New enterprises that sought outside financing from wider circles of investors tended to define themselves as A-corporations, while issuing smaller par value equities. Existing partnerships that incorporated (perhaps to add a small number of new investors) tended to choose the share partnership label, and they issued relatively large par value shares.[12] As Gregg and Nafziger (2019) document in greater depth, A-corporations also tended to be larger (in terms of share capital), made less use of short-term credit relative to longer-term bonds, and issued smaller dividends as a share of profits. Thus,

[9] This latter impression stems from reading numerous charters (and ongoing efforts at codifying key characteris, and it is consistent with Owen (2002).
[10] Furthermore, corporations that wished to change elements of their charter, such as their system of governance or capitalization level, had to return to the Ministry and obtain a formal revision.
[11] Share partnerships, though still Russian corporations formed under the concession system, possessed many characteristics of private limited liability companies, including small circles of investors and reliance on internal financing. Rozenberg's (1912, p. 42) pamphlet on Russia's absence of limited liability partnerships complained that the partnership was "not a legal, but merely a practical form."
[12] See Owen (1991, pp. 12-13 and 152) and Gregg and Nafziger (2019). These different "self-identifications" may have also been associated with underlying differences in shareholder voting rights, board organization, or other features, although there was no one-to-one correspondence. In ongoing work, we are coding such attributes from the original charter documents.

in our analysis below, we focus on these two broad classes of corporations as a proxy for underlying governance and financing characteristics.

II.2 The life-cycle dynamics of Imperial Russian corporations in a modern lens

We are interested in whether the concession system affected the processes of corporate entry, survival, and exit, thereby possibly influencing industrial development in Imperial Russia. In pursuing this inquiry, we interpret the potentially idiosyncratic, drawn-out, and politicized process of acquiring a corporate charter as akin to an entry barrier into an advantageous organizational form. If this sort of entry was particularly onerous in the Russian context, the characteristics of those corporations after first receiving a charter, as they evolved over their lives, or just prior to their exit may have been distorted. While we cannot compare our findings to those of a counterfactual "non-concession" world, we ask whether underlying firm attributes or economic conditions at the time of concession were associated with differences across the corporate life-cycle, and we juxtapose our findings with similar results from studies in other contexts. In this section, we draw out insights from the theoretical and empirical literatures on firm life-cycle dynamics to help guide our subsequent empirical analysis.

The modern theory of firm dynamics posits that cost or productivity "shocks," which can be conceptualized as a pre-entry firm "quality" draw or as shocks experienced once in the market, underpin firm entry and continuation decisions (e.g. Hopenhayn, 1992; Clementi and Palazzo, 2016; Pugsley et al., forthcoming). In this framework, firms enter if their "net" productivity (or cost advantages) exceeds some threshold, implying expected positive present discounted profits, and exit if outcompeted by other entering firms. Along the way, firms may face time-to-build (capital) constraints, while slowly resolving initial uncertainty about demand conditions, costs, and other factors and possibly learning about their latent "true" productivity (e.g. Jovanovic, 1982; Ericson and Pakes, 1995). This implies that firms may be smaller, less profitable, and less productive upon entry, relative to incumbents.[13]

If entry costs are relatively high in a given market, the threshold for realized or expected firm productivity among entrants will rise, reducing the rate of overall entry *and* improving the

[13] In a sense, this ignores the possibility that new firms could be more innovative and therefore have an immediate cost or competitive advantage. Implicitly, we assume that the limited innovation displayed by the Imperial Russian industrial sector was no more likely among new firms. On a summary of the evidence regarding entry and the characteristics of new firms, see Geroski (1995). As one more recent example, Liu and Tang (2017) establish that Canadian new entrants are weaker than incumbents along a number of dimensions. Many papers find that new firms are more likely to fail (see below), thereby implicitly suggesting that entrants are relatively weak.

average (at least in expectation) "quality" of those that do enter.[14] How might this logic apply to the seemingly costly system of concessionary incorporation in Imperial Russia?[15] Relative to a (unobservable) world with easier incorporation, newly chartered Russian corporations would likely be of higher initial quality. As both pre-existing firms (partnerships, etc.) and *de novo* concerns sought out corporate charters during this period, we might expect the former to face lower barriers within the concession system, since presumably they had better knowledge of their own underlying quality, of the relevant bureaucrats and processes, and of the market as a whole.[16] This would suggest relatively greater positive selection among the pre-existing firms that incorporated. However, by its nature, our data describe *de novo* corporate entrants only after entry, and we do not observe the entire population of potential entrants into incorporation. This implies that the observed *de novo* corporations survived a potentially costlier process to get to that point, thereby possibly generating greater positive selection of outcomes upon entry. We evaluate these alternative hypotheses in our empirical work.

Standard models frame firm entry as both extensive (i.e., to enter or not) and intensive production or pricing decisions, with the specifics of the latter dependent on the relevant technologies and the structure of the market in question. The structure, in turn, may vary over the business cycle, and so entry can look quite different across firms facing different economics conditions. This has been an important theme of recent studies into firm dynamics over the business cycle, a number of which argue that firms born in recession years look quite different – both at founding and subsequently – to those founded in expansionary periods. For example, in contexts where barriers are relatively low – such as business formation in the modern United States – entry tends to be procyclical, but entrant quality is generally countercyclical (e.g. Clementi and Palazzo, 2016; Tian, 2018).[17] This can have life-cycle implications for firms, which we discuss below. And while perhaps stretching the metaphor, the concession system enabled corporate "entry" by very different firms in

[14] There is a literature on regulatory burdens as entry barriers and the implications for firm entry rates that relates to our framework. For example, Bripi (2015) finds that areas with lower regulatory ("red tape") barriers in Italy in the mid-2000s saw higher entry rates with little difference in the subsequent performance of firms.

[15] We are, in effect, interpreting the concession system as an entry barrier in the sense of McAfee et al. (2004), where not only were their significant costs involved, but incumbents could plausibly constrain incorporation of entrants through their political connections. It is important to note that we do not have direct evidence on the latter possibility in the Imperial context. However, the legal rights of incumbents to collude (form syndicates in the parlance of the times) and engage in various actions to maintain market positions suggests that such endogenous barriers could have existed. See Cheremukhin et al. (2018) for general comments along these lines and McCaffray (1996) for a discussion of the political economy of the Russian coal and steel industry in this period.

[16] The literature has suggested that relative to the diversification of existing firms into new activities, *de novo* entry is generally more common, although this can vary widely by industry (Dunne et al., 1988; Geroski, 1995). One limitation of our data in their current form is that we do not observe merger or acquisition activity. In many contexts, this can be an important consideration in understanding the levels and underlying determinants of entry and exit rates (i.e. Jovanovic and Rousseau, 2008). To our knowledge, the historical literature on Imperial Russia has not generated any definitive work on mergers or acquisitions.

[17] Artunc (2020) also finds countercyclical firm quality among entrants in early 20th century Egypt.

terms of formal (chartered) structures, internal governance, and management practices. Was such variation associated with initial corporate performance? While we do not have strong priors in either case, we consider both differences in organizational form and macroeconomic conditions at the time of founding in our analysis below.

Fundamentally, the concession system was a political barrier to corporate entry in a setting where the Imperial Russian state could and did intervene in myriad aspects of economic life.[18] The implication is that the connections a firm possessed might allow it to overcome poor fundamentals or negative shocks that would otherwise prevent incorporation. In a variety of contexts, studies have found that firms benefit from political connections in all sorts of ways (e.g. Faccio, 2006; Fisman, 2001). In terms of entry, this might mean a reduction in red tape or otherwise "worse" firms jumping ahead in a regulatory queue.[19] However, if the concession system was intended, in part, to vet potential corporations to identify economically valuable firms and avoid promoting entities likely to quickly collapse, then better connections of the founders might actually improve this process in the face of information asymmetries.[20] Using our data on Russian corporate founders, we can explore the association between entrant performance and the extent of such connections.

After entry, firms act to maintain profitability and compete to capture market share in the process. This may entail investments of different sorts, from workforce to capital to innovation, all of which may take several periods to be realized. While buffeted by shocks of various forms that may vary over the business cycle, firms are also likely to engage in a process of learning about their own capabilities, about their competitors, and about market demand conditions. Over time, prior entrants who survive this process may see their productivities, profits levels, and market shares converge to those of incumbents through a selection process. Such trajectories could reflect underlying movement towards some sort of "optimal" in terms of productive capacity and output – i.e. scale, efficiency-enhancing technologies, or workforce attributes, as firms that fail to adjust (perhaps receiving adverse shocks along the way) exit.[21] If entry barriers – including costly investments that

[18] Such an interpretation of the Imperial concession system is consistent with entry "regulation" as a source of rent-seeking by bureaucrats and politicians. See Djankov et al. (2002), who make such an argument and provide supporting, modern, cross-country evidence.

[19] Fisman (2001), Ferguson and Voth (2008), and other studies consider how firm valuations and performance measures evolved as political connections (or the political environment) changed. Such outcomes may reflect the current valuation or impact of expected changes in the availability of credit, preferential access to markets, etc. We only have cross-sectional information on Russian corporate founders (faced with an absolutist regime), so such an approach is not possible in our context.

[20] Braggion and Moore (2013) find that politically involved corporate directors aided the placement of securities in Victorian Britain, this generating cheaper financing for such firms (particularly those employing newer technologies).

[21] Such shift toward an optimal firm "size" is suggestive of the "survivor" methodology pioneered by Stigler (1958), which Atack (1985) subsequently applied to historical data to estimate optimal industrial plant size over the last half of the 19th century in the United States. However, Guerts and Van Biesebroeck (2016), among other scholars, point to a much more complicated interaction between entry, firm size, and firm growth, particularly if adjustment costs (in hiring factor services or obtaining additional inputs) are significant but vary across firms. And while the convergence of profits may be true in a broad sense and in some circumstances (e.g. Maruyama and Odagiri, 2002; for mid-century Japanese

take time (in the face of financial frictions) – raise the initial threshold for the productivity or quality of entrants, this may have implications for the rate or extent of convergence. And in a looser sense, the speed of any firm-level convergence has implications for the level of "competition" in a given market or economy. We view all of these possibilities as plausible in the Imperial Russian corporate sector.

Given these possibilities, we can consider how firm outcomes – size, market share, and profit levels – varied after incorporation, and whether initial conditions associated with differential (corporate) entry barriers in the Imperial concession system affected subsequent firm life-cycle dynamics.[22] While convergence processes over the lives of firms have been documented in developed country settings (see the above Footnote), we are unaware of similar studies for either historical or less developed economies. This means that although we can structure our empirical work to document the existence, speed, and variation of such convergence among entering corporations in the Russian context, interpreting our findings is difficult in the absence of suitable benchmarks.[23] Our conclusions regarding corporate convergence and the competitiveness of Imperial Russian industry are, thus, speculative in nature.

The above discussion highlights a number of factors relevant for understanding differences among Imperial corporations at the time of entry and as they selectively survived. Following a similar logic, we can examine the characteristics associated with firm exit. Firms that receive adverse "shocks" (relative to other firms or in aggregate) in a given period may see their expected or realized profits or productivity fall below a threshold continuation value and decide to exit the market. This is more likely if a firm already possesses some underlying weakness that makes it difficult to respond to any such negative shocks. The exit of observationally worse firms – defined in various ways – would lend support to such a framework, suggesting that standard notions of market competition apply. Conversely, in a context without such pressures on weaker firms, their subsequent persistence might imply substantial inefficiencies. Either way, we can explore differences between exiting and non-exiting corporations to get at such possibilities within the Imperial corporate sector.

firms), Cubbin and Geroski (1987) famously found limited evidence among UK firms between the 1950s and 1970s. There is a substantial literature on the existence and rate of firm profit and size convergence. We are not aware of specific studies of market share convergence (however, see the example in Disney et al., 2003), although there is a literature on factors driving the volatility of such shares.

[22] The convergence of profitability and market share are particularly complex, as they depend on the underlying market structure and its dynamics in complicated ways.

[23] In his survey of stylized facts about firm entry, Geroski (1995), notes a convergence rate of about 10 years for firms to reach incumbent size in developed countries. Disney et al. (2013) note a similar period for market share convergence among UK firms in the late 1980s.

The literature has emphasized several factors that could reduce the likelihood of firm exit, even in the face of adverse shocks.[24] Larger firms (in terms of assets or other indicators) might be better diversified and, therefore, effectively insured against adverse conditions in one market. Alternatively, larger firms might face fewer financing constraints (in the face of imperfect financial markets), entail significant liquidation costs that would forestall closing down, or simply deter entry in ways that reduce competitive pressures. Even smaller firms may survive if they have political or social connections that enabled lifeboat financing, preferential access to markets, or other forms of government help in adverse times. Thus, we investigate whether politically connected Russian firms, conditional on size and other attributes, overcame potentially weak fundamentals to stave off exit.

Organizational flexibility in terms of governance and decision-making processes certainly might matter during times of crisis, suggesting a possible relationship between corporate structures and the likelihood of exit. While the Russian concession system enabled entry into very different sorts of corporate forms, our data only allow a broad-brush examination of any connection to the likelihood of exit.[25] Regardless of precise organizational form, political connections, or initial size, Baldwin and Gorecki (1991) and other scholars emphasize that *de novo* firms, although perhaps armed with more advanced technologies or other advantages, tend to fail at higher rates as they struggle to establish customer bases and carve out market shares. However, as selection takes place, such a gap should decline over time. Indeed, whether through (positive) selection or learned advantages, the literature has long emphasized the positive linkages between firm age and survivorship, conditional on other factors.[26] Finally, some recent studies have emphasized that business cycle conditions at the moment of firm founding (corporate chartering and operating in our setting) can have persistent effects on firms, especially given the possible effects of changes in threshold entrant

[24] An immense literature tries to identify factors that drive firm, plant, or corporate exits (from mergers to closings to liquidations to de-listings) in a wide variety of settings. Much of this literature is aimed at better understanding the factors driving exit as the end point to a (previously newly entered) firm's life-cycle. For useful discussions, see the relevant portions of Audretsch and Mahmood (1995), Bartelsman et al. (2005), Disney et al. (2013), Dunne et al. (1988), He and Yang (2016), and McKenzie and Paffhausen (2019). For a comparable (to our work) historical study of corporate survivorship in the Australian context, see Panza et al. (2018).

[25] Gregg and Nafziger (2019) provide cross-sectional evidence suggesting that, conditional on size, industry, and other characteristics (such as age), the exact choice of organizational form had little relationship to profitability among Russian corporations. However, a more dynamic perspective might suggest a residual role for underlying governance or financial differences by corporation type. For example, the more widely-held A-corporations may have responded less effectively to market downturns or may have been more fragile because of governance costs, roughly following the logic of Hilt (2006). Thus, we investigate the relationship between A-corporation status and both entry and exit rates (conditional on industry and other factors).

[26] More generally, the literature has posited various channels linking firm age to growth, exit, or the probability of continued survival (e.g. Kueng et al., 2014). For example, some studies note that "natural selection" might lead the most productive and resilient firms to persist, thereby generating a negative relationship (e.g. Bellone et al., 2008). On the other hand, agency theory might suggest that older corporations would be more likely to be captured by insiders, which would reduce profitability and the likelihood of survival (e.g. Arikan and Stultz, 2016).

"quality." For example, Moreira (2017) finds evidence for the recent U.S. that the size and productivity of firms varies across entering cohorts according to business cycle conditions and this heterogeneity persists over time. We examine whether the likelihood of exit differs depending on the macroeconomic conditions that prevailed at the time of incorporation.

We can take each of these possibilities to our panel data to study the factors associated with corporate exit. Given that exit is an absorbing state conditional on survival up to that point, we make use of hazard models to estimate how the probability of "failure" varies according to these different corporate attributes. This is standard in the industrial organization literature and has seen some historical applications with richer firm panel datasets.[27] Since we investigate corporations rather than other organizational forms potentially easier to dissolve, our baseline hazard rates may be lower than standard estimates in the literature.[28] However, as the overall and sectoral exit rates in Table 1 and below suggest, exit as we define it was prevalent over our sample period, which suggests that there is room for evaluating the marginal contributions of various corporate attributes in such a conditional hazard framework.

Firm entry, growth, and exit lie at the heart of market economies, and the Imperial Russian economy was no exception. As newer corporations were chartered, and as successful corporations survived and grew while weaker ones perished, the "churning" of these firms likely improved the allocation of productive factors and potentially encouraged technological growth. Documenting the extent of entry and exit, coupled with an examination of the drivers and effects of these processes, is an important step in evaluating such churning. Along these lines, our empirical work throughout the rest of the paper is deeply informed by Dunne et al. (1988), who undertook an influential empirical investigation of firm entry and exit patterns in the United States between 1963 and 1982.[29] In their analysis, they find that industries with high entry rates also tend to have high exit rates, although within industry, entry and exit rates are negatively correlated: years with high entry rates tended to have low exit rates. We begin our empirical work below with a similar descriptive analysis of the level and variation in entry and exit rates of Imperial Russian corporations over time and across industries.

[27] Historical works that model firm exit using a hazard function approach to survival include Klepper (2002), Postel-Vinay (2016 – on banks), and Thompson (2005). For an early application using modern firm micro-data, see Audretsch and Mahmood (1995).

[28] The role of dissolution costs in lowering the "exit" rate of corporations relative to other organizational forms is an important point raised (and shown) in the early 20th century Egyptian context by Artunc and Guinnane (2019).

[29] For studies of firm entry and exit in other developed economies, see the papers cited under Table 1 and elsewhere in this section. This literature is surveyed in Caves (1998). Studies of firm creation / entry before World War II are relatively few (two exceptions are Baten, 2003; and Lloyd-Jones and Le Roux, 1982). Work on firm "demographics" in modern developing countries also faces considerable data constraints – see Bartelsman et al. (2004 and 2005) for surveys of what is a small literature.

As emphasized in this section, business cycle conditions might be associated with the entry of particular types of firms, and these differences across cohorts could persist over their life-cycles, impacting their subsequent probability of exit (Moreira, 2017; Pugsley et al., forthcoming).[30] If aggregate booms generate more entry, and busts generate less, business cycle fluctuations may have ripple effects over time on the survival and success of the affected cohorts. Clementi and Palazzo (2016) emphasize that this process can amplify and lengthen business cycles. However, as Artunc (2020) shows in the mid-20th century Egyptian context, the life-cycle events (but perhaps not quality) of corporations can be more acyclical than non-incorporated firms, potentially due to the relatively greater costs and the politics of entry and exit. While we do not have the requisite data on non-incorporated Imperial firms to make a similar comparison, we can evaluate the cyclicality of corporate entry and subsequent exit as part of the empirical work undertaken in the following sections to help diagnose the nature of the market processes operating in the industrial sector of the late Imperial Russian economy.

III Data

Our panel dataset is based on newly compiled balance sheet data on all Imperial Russian non-financial corporations active from 1899 onwards.[31] We first collected financial data from all corporations reported in the Ministry of Finance's *Yearbooks* published from 1900 through 1915.[32] The Ministry of Finance compiled the balance sheet information in their yearbooks from the official commercial periodical *Vestnik finansov i torgovli*,[33] where corporations published financial statements as required by the commercial code and by their individual charters.[34] These volumes provide largely

[30] This could be related to differences in the distributions of shocks that occur in such years, which would affect the mass of firms above or below an entry threshold.

[31] Corporate commercial banks' balance sheets were reported separately; we have not yet fully compiled this information. Note that we use the phrase "balance sheet" as shorthand for the register of assets and liabilities noted in the historical sources, although these data diverge from modern accounting standards.

[32] While such public financial statements were required before 1900, only from that year did the Ministry of Finance collect and publish the relevant data in a unified manner. We end our period of analysis with the onset of Russia's involvement in World War I.

[33] *Vestnik finansov i torgovli. Otchety torgovlykh i promyshlennykh prepriiatii*.

[34] Figure A1 in the Appendix presents an example of such an entry in both sources for the Martens and Daab Partnership in the 1900-1901 accounting year. Panel A of Figure A1 shows that Martens and Daab had 63,853 rubles in the credit column of their balance sheet published in the Vestnik, which is the number reported in the "Creditors" column of the compiled Ministry of Finance *Yearbook* (1902 volume) balance sheet data in Panel B (and enlarged in Panel C). This and other spot checks of the two sources suggest that the published tables accurately report the published balance sheet information in a usefully unified way. Gregg and Nafziger (2019) discuss the basics of accounting in published Russian financial data of the period – also see below.

complete data on corporations for the accounting years 1899–1914, with a small number of observations from earlier years.[35] We matched these company entries over time by hand to form an (unbalanced) panel, taking care to address and reconcile different spellings and marginal changes in corporate names.[36] We then merged the resulting dataset with the RUSCORP database (Owen, 1992) to incorporate the information from founding charters documented in that source.

The key variables of interest in this paper are the occurrence and rates of exit and entry by corporations, which we define indirectly within our panel. A corporation is said to enter in a given year when that year is the first time it is observed in our dataset. We use the 1899 cross-section as the baseline. A corporation is said to exit if it is never observed again after a given accounting year. Following Dunne, Roberts, and Samuelson (1988, p. 502), we define the aggregate entry rate for an accounting year or for a given group as the number of new corporations in year t divided by the total number of corporations in year $t-1$. Similarly, the exit rate in accounting year t is the number of corporations in year t that are never observed again in our data, divided by the total number of corporations in year t. Implicitly, we assume that new corporations in 1900 did not exist before our baseline year of 1899 (we have checked this using RUSCORP), and that exiting ones in 1913 did not return after 1914. In our empirical work, we generally truncate the sample after 1912 to ensure that we are identifying "true" exits.

Our definitions may miss two key aspects of broader notions of firm entry or exit. On the entry side, we know whether the firm existed prior to incorporation, but we currently cannot separate mergers of existing corporations from the observationally equivalent exit of two (or more) firms and the entry of a new one into corporate status. On the exit side, we assume that disappearance from our data equates to "exit" in the sense of corporations shutting down (perhaps with assets acquired by other corporations). Although we are not aware of specific empirical evidence on the prevalence of such cases in Imperial Russia, it is possible that some of what we are calling exits were parts of mergers or other restructurings. It may be that some corporations "went private," gave up status as a corporation, and stopped publicly reporting financial information to the Ministry of Finance. We

[35] Our sense is that the number of missing observations is small, although see our discussion of the 1905 data below. A key difficulty is that our identification of corporations stems from charter information (derived from Owen, 1992), but such firms may not have immediately begun operations, if they even operated at all. Moreover, while it appears that the Ministry compiled and published all available balance sheet information issued in *Vestnik finansov i torgovli*, this is certainly not the case for the 1905 cross-section. However, we do check for the presence of corporations missing from one year in subsequent years, and we condition on cohort or year in most regression specifications.

[36] This process yielded a small number of duplicate observations, which we reconcile following an algorithm described in the Appendix.

do not have strong priors regarding any bias generated by the small likelihood of this type of measurement error.[37]

In our analysis, we also take advantage of other information reported in the published balances. Following common practices at the time, the balance sheets were divided into "active" and "passive" sections, which roughly correspond to modern definitions of assets and liabilities.[38] The active columns include property, materials, debits, other items, and losses; the passive columns include share capital, reserves, amortization, other capital, and "creditors." We consider "property" to be fixed and movable forms of capital, materials to be intermediate inputs, and "debits" to be comparable to accounts receivable. "Total assets" is thus the sum of all items on the Active side. "Other capital" includes bonds. "Share capital" is current nominal capital, some of which may not yet be paid in, and we deem "creditors" to be equivalent to accounts payable. Appendix Table A1 provides the correspondence between the original Russian and our translations.

Until the 1909 cross-section, the balance sheets also reported total revenue and total expenditure by the firm. When the difference between revenues and expenditures was positive, it was reported as Net Profit, because this account could then be used to pay dividends. After 1909, the published balance sheet information ceased including total annual revenues and expenditures. Instead, the volumes reported direct measures of profit, either the difference between assets and liabilities ("balance profit" – 1910 onwards) or a measure of net profits used for dividends ("profits for distribution" – 1911 onwards). We believe that profits for distribution most closely resembles the earlier definition of net profit. Thus, our preferred measure over the whole panel uses balance profits in 1910 and profits for distribution from 1911 onwards. Because the definition changes slightly, we include controls for the accounting year in our empirical work below.

III.1 Summary statistics on imperial corporations

Our dataset describes 2,865 unique corporations observed in at least one year, for a total of 19,797 observations (Table 2). From 1700 to 1915, the Russian Ministry of Finance granted corporate charters to only 4,542 firms, of which 345 were finance corporations and thus outside our current database. Despite only covering the last 15 years of Imperial Russia, our dataset covers almost 60% of the total non-financial corporations established in the Empire.[39]

[37] We have double-checked our matching process to ensure that new and exiting corporations in adjoining years were distinct firms. Our examination of the contemporary literature has turned up no obvious cases of "going private" or of mergers that would violate our assumptions.
[38] These balance sheets mix concepts related to stocks (assets and liabilities) with flows (of cash), which are typically kept separate in modern accounting practices.
[39] Our data include corporations headquartered in the Polish provinces of the Empire. In general, we exclude railroad corporations, which were mostly public or quasi-public entities by our time period.

Table 2 Numbers of corporations by accounting year and industry

Panel A: Number of observations and unique firms

	Number
Total observations	19,795
Unique firms	2,865

Panel B: Number of corporate observations by industry, 1896–1914

Industry	Number	Percentage	Percentage of total share capital	Number of unique corporations
Agriculture	94	0.47	0.15	12
Animals	296	1.50	1.02	50
Ceramics	885	4.47	2.60	130
Chemicals	975	4.93	4.30	157
Food	3,553	17.95	9.17	413
Metals	2,408	12.16	16.89	385
Mining	2,283	11.53	20.13	348
Miscellaneous	904	4.57	4.38	147
Municipal serv.	1,494	7.55	6.38	266
Paper	726	3.67	1.82	102
Textiles	3,514	17.75	21.21	408
Trade	1,387	7.01	5.19	232
Transportation	818	4.13	5.63	133
Wood	458	2.31	1.14	82
Total	19,795	100	100	2,865

Panel C: Number of corporate observations by accounting year, 1896–1914

Accounting year	Number	Percentage	Accounting year	Number	Percentage
1896	1	0.01	1906	1,260	6.37
1897	7	0.04	1907	1,280	6.47
1898	215	1.09	1908	1,370	6.92
1899	947	4.78	1909	1,154	5.83
1900	1,102	5.57	1910	1,454	7.35
1901	1,190	6.01	1911	1,474	7.45
1902	1,249	6.31	1912	1,590	8.03
1903	1,273	6.43	1913	1,712	8.65
1904	1,126	5.69	1914	1,113	5.62
1905	278	1.40			
			Total	19,795	100

Note: The source of these data is *Ezhegodnik ministerstva finansov* [Ministry of Finance Yearbook], 1900–1915. See the text for further discussion.

Textiles, foods, metals, and mining represent the largest industrial categories in our data (Table 2, Panel B). Gregg's (2020) work on incorporation notes that textiles, metals, and mining were capital-intensive industries with high incorporation rates. Moreover, Imperial Russia possessed a large foods industry, in terms of both incorporated and non-incorporated enterprises. Consequently, a large number of our balance sheet observations document food-related enterprises. Finally, Table 2, Panel C shows that the implied annual number of corporations in our database was relatively stable except for some reporting of earlier accounting years in the 1900 Ministry of Finance yearbook. An exception is the year 1905, when data from only 278 firms were reported. This may be attributable to the disruptions caused by the 1905 Revolution, the Russo-Japanese War, and general social unrest. We control for accounting year in our regression work to (partly) address this disparity.[40]

Table 3 provides summary statistics of select variables from the published corporate balance sheets and original charters that we utilize in this paper. As is standard in the corporate finance literature, we scale a number of these variables by the value of total assets. Every balance sheet item has a right-skewed distribution, with the presence of some extreme large values. Aside from these financial variables, we also draw on information from the RUSCORP database regarding the type of corporation (A-corporation or share partnership, defined by the Russian word used to denote an equity stake), the age of the corporation, and whether it was a new firm or not when it obtained a charter. Finally, also from the RUSCORP database, we extract whether any corporate founders were members of the nobility (possessed noble rank) or were government officials (or both), to define an indicator variable for whether a corporation had a "politically connected" founder. Almost thirty percent of corporations had such a founder according to this definition.

We employ the panel dataset to derive corporate entry and exit rates over time and across industries. Table 4 reports the former between 1900 and 1913. Entry rates were high at the beginning and end of the period with a lull in the middle (although 1906 appears to indicate a rebound from the crisis year of 1905). Exit rates were relatively constant with a small upward trend. The very high level of exit in 1913 is likely an artifact of the dataset, as we cannot look beyond 1914 to check whether non-reporting corporations continued to survive. The difference between entry and exit rates is broadly suggestive of three sub-periods: entry-dominant until 1904, then a two-year period

[40] Most of the accounting years before 1899 appear in the 1900 Ministry of Finance yearbook. In each subsequent yearbook, most observations cover the preceding accounting year, though a small number report information from two or more previous accounting years. Throughout the analysis below, we rely on the accounting year to pin down each cross-sectional observation. Many of the "disappeared" 1905 firms reappear in later years, meaning that absence in 1905 is not treated as exit in our framework. We have surveyed the original *Vestnik finansov i torgovli* 1905 and 1906 to see if the compilation process (for the yearbooks) was to blame, but that does not seem to be the case. We have also checked the robustness of our findings to omitting the years 1904 and 1905 (not reported).

of relatively more exit, and then a rebound in entry. We are wary of attributing too much to the end points of our period, because there may be a mechanical reason for the observed higher rates.

Table 3 Descriptive statistics on select balance sheet entries (nonzero values only) and other corporate characteristics

Variable	Obs.	Mean	Std. dev	Median	Min	Max
Share capital	19,795	1,685,624	2,620,916	800,000	1,123	74,800,000
Total assets	19,789	4,808,307	14,500,000	1,964,828	11,360	507,000,000
Property / Total assets	19,631	0.49	0.24	0.49	0.00000210	1.00
Creditors / Total assets	19,532	0.31	0.25	0.29	0.00000026	12.60
Net profit / Total assets	15,706	0.06	0.08	0.05	0.00000152	5.43
Revenues	9,987	1,484,061	4,053,757	496,322	5	112,000,000
Age of corporation	19,794	13.33	12.48	10	1	83
De novo at founding	12,564	0.280	0.449	0	0	1
A-corporation	12,760	0.511	0.500	1	0	1
Has gov't founder	18,479	0.204	0.403	0	0	1
Has noble founder	18,479	0.110	0.313	0	0	1
Has military founder	18,479	0.092	0.288	0	0	1
Has gentry founder	18,479	0.182	0.386	0	0	1
Has noble OR gov't founder (has pol. conn.)	18,479	0.272	0.445	0	0	1

Note: The source of these data is *Ezhegodnik ministerstva finansov* [Ministry of Finance Yearbook], 1900–1915. "Share capital" is current nominal (paid and unpaid) capitalization. "Total Assets" are defined as Property + Goods and Materials + Accounts Receivable + various other assets. "Creditors" is roughly equivalent to accounts payable. Profit in 1910 is "Balance Profit", and Profit after 1911 is "Profits for Distribution. Revenues are only defined to 1909 and not for all firms. These financial variables are summarized for observations > 0. The Age of the corporation is defined from the date of founding OR the date of entry into the balance sheet data if the former is unknown. "De novo" indicates whether the firm existed prior to receiving a corporate charter (=1) or not (=0). "A-corporation" indicates whether the firm was this type of corporation, as opposed to one that utilized the word "pai" for its shares. De novo and corporate form are unknown for some corporations in the data. See the text for additional discussion.

Table 4 also juxtaposes the annual percentage change in real NNP from Gregory (1982) against our corporate entry and exit rates. Years with negative percentage changes are highlighted in grey; we code these years as "recession years" in several analyses below. Overall, the simple correlations of either the entry or exit series with the percentage change in NNP are very small. While this might be because NNP captures more than just the industrial sectors underpinning our dataset (or there

may be a lagged relationship between the series), it may also reflect structural issues surrounding the incorporation process, a possibility we return to below.

Table 4 Number of corporations, entry rates, and exit rates by accounting year (years shaded grey are "recession" years)

Year	Number of corporations	Number of entrants	Number of exiting corporations	Entry rate	Exit rate	Entry rate – Exit rate	% change in NNP in 1913 Rubles
1900	1102	211	39	0.223	0.035	0.187	0.001
1901	1190	157	36	0.142	0.030	0.112	0.041
1902	1249	87	53	0.073	0.042	0.031	0.103
1903	1273	100	61	0.080	0.048	0.032	–0.056
1904	1126	97	87	0.076	0.077	–0.001	0.122
1905	278	20	34	0.018	0.122	–0.105	–0.096
1906	1260	83	35	0.299	0.028	0.271	–0.032
1907	1280	42	37	0.033	0.029	0.004	–0.019
1908	1370	95	95	0.074	0.069	0.005	0.110
1909	1154	84	72	0.061	0.062	–0.001	0.076
1910	1454	158	110	0.137	0.076	0.061	0.095
1911	1474	145	99	0.100	0.067	0.033	–0.059
1912	1590	207	139	0.140	0.087	0.053	0.107
		Overall averages		0.118	0.057	0.061	
		Averages in recession years		0.121	0.048	0.073	

Sources: Ezhegodnik ministerstva finansov [Ministry of Finance Yearbook], 1900–1915; and Gregory (1982, pp. 56–7, "Variant 1"). Notes: A corporation enters the data in a given year when that year is the first time the corporation is observed in the dataset, using the 1899 cross-section as the baseline. A corporation is said to exit the data if it is never observed again after a given accounting year. Following Dunne, Roberts, and Samuelson (1988, p. 502), the entry rate for accounting year t is the number of new corporations in year t divided by the total number of corporations in year $t-1$. The exit rate in accounting year $t-1$ is the number of corporations in year $t-1$ that are never observed again divided by the total number of corporations in year $t-1$. We do not report 1913 due to high exist numbers that year, which reflect the truncation of the dataset in 1914. Year is the accounting year. Additional years with negative percentage changes in Gregory's measure of NNP are: 1886, 1888, 1889, 1891, 1895, and 1897 (See Appendix Table A3).

Table 5 documents entry and exit rates by broad industries. The pattern of entry and exit show that some industries have a relatively high level of "churning." While some of the older or primary sector industries such as textiles, agriculture, and paper saw relatively little corporate churning over the period, more "modern" sectors such as chemicals, transportation, and metals (along with "Miscellaneous") saw higher entry and exit rates, with the former exceeding the latter. Meanwhile, some industries had entry rates that exceed exit rates, perhaps indicating that an industry was in disequilibrium, and that positive profits could still be captured. The large (net) entry of corporations engaged in trade is particularly striking. This group included shipping companies, wholesalers, and companies engaged in foreign trade. Overall, high churning (and even net entry) in new sectors is suggestive of a shift of productive factors into higher growth corporate sectors.

Table 5 Entry and exit by industry group, 1900–1912

Group	Entry rate	Exit rate	Difference
Agriculture	0.040	0.060	–0.020
Animals	0.132	0.085	0.047
Ceramics	0.124	0.077	0.047
Chemicals	0.165	0.061	0.103
Food	0.067	0.032	0.035
Metals	0.134	0.082	0.052
Mining	0.142	0.070	0.072
Miscellaneous	0.214	0.053	0.161
Mun. Services	0.193	0.092	0.101
Paper	0.114	0.047	0.067
Textiles	0.076	0.035	0.041
Trade	0.263	0.031	0.232
Transportation	0.156	0.092	0.064
Wood	0.137	0.066	0.071
Average	0.130	0.057	0.073

Note: The source of these data is *Ezhegodnik ministerstva finansov* [Ministry of Finance Yearbook], 1900–1915. These data represent unweighted mean entry and exit rates by industrial group across years (1900 to 1912, inclusive). The definitions of entry and exit are as in Table 3.

IV Corporate entry, evolution, and exit: empirical evidence

Our new dataset covers the universe of industrial corporations in late Imperial Russia. Drawing on these data, we focus on identifying the factors or characteristics associated with corporate creation, destruction, and survival in order to address three key questions. First, did economic fundamentals impact these processes in ways that make economic sense, given the particular constraints of the concession system? Second, how did entry and exit of corporations play out over the business cycle? Third, if the Russian context entailed substantial constraints on corporate founding, did the political "connections" of the founders ease them, thereby impacting entry and exit? Our regression exercises that address these questions are not exhaustive and should be interpreted as largely descriptive, as we do not structurally estimate the drivers of entry, survival, or exit. Moreover, our focus is on financial attributes and not real productivity, which is driven by the source of our data. However, taken together, our empirical work provides insights into the nature of corporate churning; the allo-

cation of productive factors across firms, within sectors, and over time; and the competitive dynamics of early Russian industrialization, while prompting further questions regarding the role of the corporation in the late Imperial economy.[41]

IV.1 Entry

We first consider the balance sheet characteristics of new entrants into corporate status. In a context where "entry" required a substantial and idiosyncratic process of acquiring a charter, how exactly did newly founded corporations compare to their incumbent peers? Table 6 depicts results from regressing logged financial characteristics – total share capital, profits relative to share capital, and credit relative to share capital – on different sets of dummy variables and interactions. The key explanatory variable is a dummy for whether the observed firm is a new entrant in a given year, as we define above. Each specification in this table controls for the accounting year. Those reported in Columns 1, 2, 5, 6, 9, and 10 all include a set of dummies for each corporation's industry and for the macro-regions where corporate headquarters were located.[42] Of these, Columns 1, 5, and 9 report simple OLS regressions, while 2, 6, and 9 report between estimates. These latter specifications essentially compare mean financial characteristics between corporations that existed throughout the period and those that entered at some point, conditional on the accounting year, industry, and region of headquarters. In contrast, the specifications reported in Columns 3, 7, and 11 control for corporation fixed effects, which subsume the headquarter and industry dummies. Implicitly, these regressions compare entrants with themselves when incumbents (and are suggestive of the fixed effect convergence regressions in the next section). Finally, Columns 4, 8, and 12 document fixed effect models that also include interactions between entry status and dummies for whether a corporation was chartered *de novo*, whether it was founded as an A-corporation, and whether it was founded in a recession year.[43] The specifications in Table 6 differ in the number of observations due to missing information on the outcome variables or on these fixed firm characteristics.

[41] The Appendix (Tables A4 – A7) provide various extensions and robustness checks using sub-samples and alternative specifications to those presented in the main text. All of these generate results consistent with the ones reported in the main text.

[42] There are 14 regions in the data, including the Polish provinces, Finland, and outside of the Empire. We include these regional dummies to account for possible differences in financial development or input/output markets (including transportation costs). Controlling separately for corporations headquartered in Moscow or Petersburg does not change any of our results. The regional breakdown of our observed corporations is available upon request.

[43] We define a "recession year" to be those years where net national product growth – as documented in Gregory (1982) – was negative.

Table 6 Entrants vs. incumbent corporations, 1900–1913

	Log total share capital				Log profit / Share capital				Log creditors / Share capital			
	OLS (1)	BE (2)	FE (3)	FE (4)	OLS (5)	BE (6)	FE (7)	FE (8)	OLS (9)	BE (10)	FE (11)	FE (12)
Entrant	–0.269*** (0.027)	–0.206*** (0.069)	0.015 (0.012)	0.058*** (0.019)	–0.312*** (0.039)	–0.179** (0.074)	–0.096** (0.045)	–0.087 (0.082)	–0.307*** (0.041)	–0.205** (0.094)	–0.278*** (0.035)	–0.174*** (0.063)
De Novo * entrant				–0.030 (0.032)				–0.404*** (0.144)				–0.394*** (0.118)
A-Corp. * entrant				–0.026 (0.025)				0.026 (0.107)				–0.105 (0.074)
Recession * entrant				–0.021 (0.032)				0.064 (0.118)				0.040 (0.103)
Constant	12.926*** (0.098)	12.189*** (0.532)	13.914*** (0.011)	13.933*** (0.012)	–3.289*** (0.160)	–3.949*** (0.665)	–2.118*** (0.026)	–2.111*** (0.029)	–0.893*** (0.146)	–0.882 (0.700)	–0.600*** (0.024)	–0.473*** (0.025)
Obs	17,512	17,512	17,512	13,753	13,746	13,746	13,746	11,170	17,282	17,282	17,282	13,605
R^2	0.145	0.128	0.060	0.086	0.070	0.092	0.070	0.063	0.160	0.167	0.030	0.038
Ind. FE	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Region FE	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO
Firm FE	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES
N. firms	2,646	2,646	2,646	1,781	2,295	2,295	2,295	1,608	2,627	2,627	2,627	1,775

Note: *** p<0.01, ** p<0.05, * p<0.10. Robust standard errors are in parentheses in the OLS and FE regressions. Standard errors are in parentheses for the BE estimates. "BE" denotes panel between effects estimates, and "FE" denotes fixed effects regressions, i.e. panel regressions with firm fixed effects. The variable "entrant" denotes whether a firm in period *t* was a new entrant, compared to *t – 1*. Industry controls are a set of dummies covering 14 industries (see Table 4). Year controls are for the accounting year of the associated corporate data. Region controls indicate the location of the corporate headquarters in one of 14 macro-regions, including Poland, Finland, and abroad. The "Recession" variable equals 1 for years in which the growth rate of NNP (See Table 4) is negative in this window: 1903, 1905, 1906, 1907, and 1911 (and zero otherwise). "N. Firms" refers to the number of corporations supplying observations in each specification. Sample sizes vary due to missing data.

Table 6 presents several notable findings regarding the characteristics of new entrants. In general, a corporate "entrant" possessed lower/worse financial attributes than incumbents. As measured by the (log) share capital, entrants were, on average, smaller than incumbents (Columns 1–4), although the fixed effect model with interactions suggest that this was more the case for *de novo* firms.[44] Scaling by size (share capital), entrants were less profitable than incumbents, especially when the firm was newly established. Finally, entrants showed lower use of credit (i.e. were relatively more reliant on equity financing) than incumbents, with *de novo* firms showing especially low access. The type of corporate form was only marginally associated with any of these financial outcomes, which is consistent with (revealed) optimizing behavior by entrepreneurs in a relatively competitive environment (and suggests that *de novo* status was picking up more than organization form). If one form offered particular benefits for equity financing, profitability, or access to credit, it would be sub-optimal to choose alternative forms, but many corporations did just that. Finally, whether a corporation was founded in a recession year was also only marginally associated with these outcomes: given the time lag imposed by the concession system, corporations may not have been able to respond quickly to business cycle fluctuations.[45] In general, these findings are consistent with standard life cycle perspectives on firm characteristics, and with a chartering process that constituted a barrier to entry into the corporate form.

IV.2 Corporate life-cycles

We can further explore the dynamics of corporate characteristics following entry by utilizing the panel structure of the dataset. Did surviving firms converge to the financial or market attributes of incumbents in their industry, and if so, what was the speed of convergence, and was it consistent with a relatively competitive process of selection? To investigate these questions, we estimate the following model:

$$Y_{ijtr} = \beta_0 + \gamma_{it} + \eta_i + \mu_t + \lambda_j + \epsilon_{ijt}$$

where Y is the outcome (log (scaled) revenue, log (scaled) profit, or market share in the firm's industry) for firm *i* in year *t*, γ is a set of controls for the age of firm up to 10 years old, η is a set of cohort controls (from 1890 to 1913, with pre-1890 corporations in the omitted group) for firm *i*, μ

[44] The first row of Column 4 suggest that pre-existing share partnership entrants were larger in their first year than in subsequent ones if founded in a recession year. However, in our dataset, entrants were more increasingly likely to be A-corporations and less likely to have existed as concerns prior to incorporation, consistent with prior work on the time patterns in incorporations over the period (Gregg and Nafziger, 2019; Owen, 1991).

[45] We find similar results (not shown in text) if the chaotic downturn years of 1904 and 1905 are omitted. Our findings echo the a-cyclical nature of corporate (as opposed to partnership) entry that Artunc (2019) finds for interwar Egypt. See the discussion in Section II.

is a set of accounting year controls, and λ controls for industry j. We also estimate versions of this model without cohort controls and versions with firm fixed effects (which subsume cohort and industry controls). The latter specification means that we are comparing characteristics of corporations of a specific age to mean values across all other years *for that corporation*.

In this framework, the estimated γ coefficients express the difference between entrant firms at a given age and long-term incumbents (those who have survived more than 10 years or the firm itself). If new firms experienced convergence with these incumbents, these coefficients should be smaller at each age (as in a similar exercise studying immigrant assimilation in Abramitzky, Boustan, and Eriksson, 2014). Given that many of our corporations were founded prior to 1900, we can estimate a large set of γ coefficients.[46]

Table 7 presents the results from these exercises. New Russian corporations started with lower revenues, profits, and market share. However, they experienced substantial (and monotonic) convergence to incumbents within their industry, whether we control for cohort (Columns 2, 5, and 8) or not (1, 4, and 7). While convergence was not complete over ten years in terms of corporate revenues, it took roughly 6–8 years for profits and market share, which we define as the portion of industry-by-year revenue that a corporation generates, to approximate what incumbents received.[47] In Columns 3, 6, and 9, we extend the model of this section to include firm fixed effects. We see that after initially being small (matching the results for Table 6), firms saw revenues and market shares quickly achieve their "average" level. The absence of "within-corporation" profit convergence is consistent with incorporation as a barrier that only particularly advantaged (productivity or otherwise) firms could overcome, achieving positive profits but also subsequently encountering substantial competitive pressures.

The dynamics of market share, revenues, and profits imply a positive selection process that is consistent with competitive markets upon entry. Though the existing literature on firm life cycles dynamics (which is entirely about modern firms) offers us few benchmarks to think about possible counterfactual rates of convergence, we posit that the life-cycle experience of Russian corporations followed a logic consistent with standard depictions of competitive markets.

[46] Our results are similar if we include age coefficients up to 15 years, although the corporations generating estimates for higher ages is quite limited given the length of our sample.
[47] We do not observe revenue after 1909. Thus, the first and third specifications in Table 7 (Columns 1, 2, 3, 7, 8, and 9) are only estimated over the years 1899-1909.

Table 7 Firm characteristics over the corporate life cycle, 1900-1913

	Log revenue			Log profit			Market share		
Firm is	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1 year old	–1.418***	–1.179***	–0.283***	–0.173***	–0.181***	0.024	–0.014***	–0.017***	–0.007*
	(0.072)	(0.112)	(0.107)	(0.038)	(0.058)	(0.075)	(0.002)	(0.002)	(0.004)
2 years	–0.598***	–0.493***	–0.073	–0.084***	–0.091***	0.017	–0.007***	–0.008***	–0.004*
	(0.033)	(0.050)	(0.048)	(0.023)	(0.030)	(0.037)	(0.001)	(0.001)	(0.002)
3 years	–0.359***	–0.299***	–0.037	–0.044***	–0.052**	0.014	–0.004***	–0.005***	–0.002*
	(0.023)	(0.032)	(0.030)	(0.017)	(0.021)	(0.023)	(0.000)	(0.001)	(0.001)
4 years	–0.221***	–0.192***	–0.014	–0.044***	–0.046***	–0.009	–0.003***	–0.004***	–0.002**
	(0.016)	(0.022)	(0.021)	(0.013)	(0.015)	(0.017)	(0.000)	(0.000)	(0.001)
5 years	–0.144***	–0.127***	–0.006	–0.034***	–0.033**	–0.013	–0.002***	–0.002***	–0.001*
	(0.014)	(0.019)	(0.016)	(0.011)	(0.013)	(0.014)	(0.000)	(0.000)	(0.001)
6 years	–0.135***	–0.115***	–0.015	–0.032***	–0.029***	–0.012	–0.002***	–0.002***	–0.001*
	(0.012)	(0.015)	(0.013)	(0.010)	(0.011)	(0.011)	(0.000)	(0.000)	(0.001)
7 years	–0.088***	–0.070***	–0.011	–0.027***	–0.025***	–0.009	–0.001***	–0.001***	–0.001
	(0.011)	(0.013)	(0.010)	(0.008)	(0.009)	(0.009)	(0.000)	(0.000)	(0.000)
8 years	–0.052***	–0.045***	–0.005	–0.017**	–0.014*	–0.004	–0.001***	–0.001***	–0.001*
	(0.009)	(0.011)	(0.008)	(0.007)	(0.008)	(0.007)	(0.000)	(0.000)	(0.000)
9 years	–0.039***	–0.040***	–0.007	–0.014**	–0.012*	–0.001	–0.000**	–0.001***	–0.001
	(0.009)	(0.010)	(0.007)	(0.006)	(0.007)	(0.006)	(0.000)	(0.000)	(0.000)
10 years	–0.023**	–0.026***	0.005	–0.006	–0.004	0.003	–0.000	–0.000*	–0.000
	(0.009)	(0.010)	(0.006)	(0.005)	(0.005)	(0.005)	(0.000)	(0.000)	(0.000)
Constant	11.036***	11.084***	13.348***	–3.711***	–3.735***	–2.443***	0.169***	0.170***	0.108*
	(0.242)	(0.248)	(0.672)	(0.161)	(0.169)	(0.289)	(0.024)	(0.024)	(0.057)
N	8,853	8,853	8,853	13,745	13,745	13,745	8,853	8,853	8,853
R^2	0.188	0.200	0.017	0.039	0.044	0.061	0.191	0.198	0.126
Cohort FE	NO	YES	NO	NO	YES	NO	NO	YES	NO
Firm FE	NO	NO	YES	NO	NO	YES	NO	NO	YES
N. firms	1,703	1,703	1,703	2,295	2,295	2,295	1,703	1,703	1,703

Note: *** p<0.01, ** p<0.05, * p<0.10. Robust standard errors in parentheses. The dependent variables are denoted above the columns. The row variables are dummy variable indicators for corporations of that age. The omitted category is corporations older than 10 years. All regressions include accounting year and industry controls. "N. Firms" refers to the number of corporations supplying observations in each specification. Sample sizes vary due to the truncation of the revenue series in 1909.

IV.3 Exit

Imperial Russian firms were constrained in their choice of "entering" the corporate form, but when they did so, their initial and subsequent financial characteristics – relative to incumbents – follow life-cycle patterns likely similar to firms in other environments. Did such "normality" extend to the factors underlying the demise of corporations? In this section, we examine the underlying correlates of corporate exit, defined as the complete disappearance of a firm from our panel dataset. Given that exit is an absorbing state, a natural way to carry out this analysis is in a Cox Proportional Hazard framework, which models such conditional survival processes. The first three columns of Table 8 present estimates from such specifications, with different combinations of controls and over a truncated sample (Column 3). Coefficients greater than 1 imply an increase in the likelihood of exit relative to the baseline hazard, and coefficients less than 1 imply the opposite.[48] In these specifications, we condition on fixed characteristics (whether the corporation was *de novo,* whether it was chartered as an A-corporation, whether it found founded in a recession year, and regional and industry controls) and on the changing level of capitalization and (scaled) profits. The goal is to document whether "exiters" differed from "survivors" in ways consistent with economic theory, as applicable to this early industrializing context. We compare the estimates from these hazard models with those from a simple probit model of exit (Columns 4 and 5), and results are similar.

The findings of these exercises are largely consistent with economic intuition and shed light on the nature of corporate "churning" in late Imperial Russia. More profitable corporations were less likely to exit. While larger corporations (as measured by the size of share capital) were less likely to exit, this was apparently only the case for older firms chartered before 1900.[49] As industrial development picked up, it appears that the diversification benefits and/or liquidation costs of large corporations mattered less for dissuading exit. Conditional on size and profit levels, A-corporations were (slightly) more likely than share partnerships to exit, as were firms that existed prior to incorporation. This seems to largely reflect industry differences in corporation types (compare Columns 1 and 2), suggesting that organizational form mattered less than sectoral dynamics in determining firm exit. Similar to our results in Table 6, we find little relationship between a corporation's exit behavior and whether or not it was founded in a recession year. We interpret this result as indicative of the relatively costly concession system of incorporation; with "entry" a drawn out and often politicized process, the timing of entry did not apparently generate differentially weaker

[48] Standard errors reported in estimates of Cox Proportional Hazard models are exponentiated. We provide the (asymptotic) confidence intervals reported by STATA. One of the advantages of this type of hazard model is that the functional form of baseline hazard is not explicitly assumed.

[49] In specifications not reported here, size (as measured by revenue) also reduced the likelihood of exit. The simple probit regressions, controlling for firm age (which the hazard models essentially condition on), also show the negative size / exit relationship.

or stronger cohorts over the business cycle. Summing up, conditional on entry, we view the relationship between exit and firm size or profitability as consistent with a relatively competitive Imperial corporate sector.[50]

Table 8 Regressions predicting exit, 1900–1912

	Cox proportional hazard time to corporate "exit"			Probit P(Exit)	
			Founded after 1899		
Variables	(1)	(2)	(3)	(4)	(5)
Corporation was founded as a new firm	1.339**	1.178	1.182	0.022	0.072
	(0.178)	(0.170)	(0.233)	(0.065)	(0.065)
Firm is of the A-corporation type	1.386**	1.217	1.284	0.179**	0.116
	(0.230)	(0.213)	(0.286)	(0.074)	(0.076)
Log (share capital)	0.818***	0.837**	1.026	–0.105***	–0.085***
	(0.054)	(0.059)	(0.097)	(0.031)	(0.033)
Log (profit/total assets)	0.865***	0.863***	0.884**	–0.083***	–0.077***
	(0.033)	(0.033)	(0.044)	(0.018)	(0.018)
Born in post-1885	1.044	1.045	1.223	0.045	–0.028
Recession year	(0.153)	(0.155)	(0.216)	(0.065)	(0.066)
Corporation age					–0.017***
					(0.003)
Observations	9,866	9,866	3,293	10,167	10,167
Region controls	YES	YES	YES	YES	YES
Industry controls	NO	YES	YES	YES	YES
Year controls	NO	NO	NO	NO	NO
Pseudo R2	0.0159	0.0229	0.0223	0.0432	0.0603
N. firms	1523	1523	765	1,521	1,521

Note: *** p<0.01, ** p<0.05, * p<0.10. Robust standard errors in parentheses. Industry controls are a set of dummies covering 14 industries (see Table 4). Region controls indicate the location of the corporate headquarters in one of 14 macro-regions, including Poland, Finland, and abroad. Unlike Table 6, these specifications drop observations for 1913 to better identify true "exit." The "Recession" variable equals 1 for years in which the growth rate of NNP (See Table 4) is negative: 1886, 1888, 1889, 1891, 1895, 1897, 1903, 1905, 1906, 1907, and 1911 (and zero otherwise). "N. Firms" refers to the number of corporations supplying observations in each specification.

IV.4 Corporate founders, entry, and exit

In the context of the concession system, the personal identities of corporate founders may have influenced which firms could be granted entry and, possibly, which ones survived. Firms with politically connected founders, for example, may have faced a lower threshold (in terms of, say, productivity) for entry than firms that were more unknown from the government's point of view,

[50] As with our findings on entry, we observe similar results if we omit the years 1904 and 1905 (not shown in text).

suggesting the possibility of relative weaker performance at founding or inefficient continuation rather than exit.[51] On the other hand, political connections may have eased access to capital, technology, skilled labor, output markets, or other factors, thereby generating advantages at the time of entry and, possibly, helping perpetuate the corporation in the face of adverse economic fundamentals. In sum, political connections may have reduced the costs of incorporation while increasing the benefits of holding corporate status.

We test whether the identities of a corporation's founders mattered for entry and exit in Table 9, utilizing similar empirical models as before. A corporation has a "politically connected" founder if at least one founder is either a government official or member of the nobility. We also separately examine corporations whose founders were government officials. These designations are provided in RUSCORP, based on information in the founding charters. As noted in Table 3, about 27% of our observations were associated with a politically connected founder.

We find that the identifies of a corporation's founders were indeed related to corporate characteristics at entry and exit. Corporations with politically connected founders were less profitable and used less credit at the moment of entry (Table 9, Panel A). Such corporations, therefore, likely secured corporate charters with less evidence of previous or likely future performance. The credit finding could imply that such connected corporations either had other, unmeasured, sources of financing, or that their initial weakness was considered by the financial system. Interestingly, these results appear to have been slightly stronger for corporations with noble founders, although both types of political connections mattered. As Panel B of Table 9 indicates, we also find evidence that politically connected corporations were less likely to exit, conditional on other characteristics. While this result is only weakly significant in the Cox models, together, the findings in Panels A and B suggests that the nature of the concession system may have generated substantial constraints on overall industrial development, as potentially weaker but better-connected firms entered and persisted within the (advantageous) corporate form.

[51] In other words, political connections may have lowered the barriers inherent in the concession system.

Table 9 Founder characteristics, entry, and exit

Panel A: Entry

	Log profit / share capital		Log creditors / share capital		Log profit / share capital		Log creditors / share capital	
	OLS (1)	FE (2)	OLS (3)	FE (4)	OLS (5)	FE (6)	OLS (7)	FE (8)
Entrant	–0.358***	–0.070	–0.334***	–0.296***	–0.380***	–0.107*	–0.339***	–0.315***
	(0.049)	(0.061)	(0.049)	(0.044)	(0.049)	(0.060)	(0.047)	(0.043)
Pol. conn. * entrant	–0.287**	–0.369***	–0.314**	–0.206				
	(0.129)	(0.124)	(0.146)	(0.128)				
Has gov. * entrant					–0.222	–0.233*	–0.394**	–0.162
					(0.146)	(0.127)	(0.185)	(0.158)
Constant	–2.742***	–2.110***	–1.088***	–0.473***	–2.744***	–2.110***	–1.093***	–0.472***
	(0.240)	(0.029)	(0.187)	(0.025)	(0.240)	(0.029)	(0.189)	(0.025)
Obs	11,189	11,189	13,630	13,630	11,189	11,189	13,630	13,630
R^2	0.069	0.062	0.155	0.036	0.069	0.062	0.155	0.035
Ind. FE	YES	NO	YES	NO	YES	NO	YES	NO
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Region FE	YES	NO	YES	NO	YES	NO	YES	NO
Firm FE	NO	YES	NO	YES	NO	YES	NO	YES
N. firms	1,611	1,611	1,778	1,778	1,611	1,611	1,778	1,778

Panel B: Exit (Cox proportional hazard model)

	Cox proportional hazard model		Probit P(Exit)	Cox proportional hazard model		Probit P(Exit)
		Founded after 1899			Founded after 1899	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Firm has a politically connected founder	0.862	0.670*	–0.119*			
	(0.127)	(0.148)	(0.069)			
Firm has a gov't official as founder				0.817	0.755	–0.161**
				(0.135)	(0.196)	(0.077)
Corporation was founded as a new firm	1.203	1.232	0.048	1.186	1.177	0.039
	(0.177)	(0.245)	(0.066)	(0.171)	(0.232)	(0.066)
Firm is of the A-Corporation type	1.239	1.338	0.193**	1.237	1.303	0.193**
	(0.221)	(0.303)	(0.078)	(0.219)	(0.294)	(0.078)
Log (share capital)	0.835**	1.017	–0.112***	0.835**	1.017	–0.112***
	(0.059)	(0.097)	(0.031)	(0.059)	(0.097)	(0.031)
Log (profit/total assets)	0.863***	0.885**	–0.102***	0.863***	0.886**	–0.102***
	(0.033)	(0.044)	(0.019)	(0.033)	(0.044)	(0.019)
Observations	9,854	3,293	10,155	9,854	3,293	10,155
Region controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes
Year controls	No	No	Yes	No	No	Yes
Pseudo R2	0.0231	0.0232	0.0867	0.0233	0.0223	0.0872
Number of firms	1,522	765	1,520	1,522	765	1,520

*** p<0.01, ** p<0.05, * p<0.10. Sources: Ezhegodnik Ministerstva Finansov and Ruscorp. All regressions in Table 9 have robust standard errors in parentheses. "N. Firms" refers to the number of corporations supplying observations in each specification. The regression in column 3 has a constant term (not shown). A corporation has a "politically connected" founder if the corporation has a noble OR government official among its founders, as defined by Owen's 100 and 200 numbered categories in RUSCORP. A corporation has a government official if one of its founders is from the 200 category.

V Conclusions and future work

The corporate form provided clear advantages (Gregg, 2020), but acquiring a charter was a costly barrier for Imperial Russian firms. This paper engages in a series of empirical exercises that, in sum, suggest that Imperial corporate behavior was largely consistent with observed and hypothesized patterns of firm entry, exit, and life-cycle dynamics in modern and historical literatures. Despite Russia's apparent backwardness, we are able to link the industry, age, size, profitability, and governance structure of these historical corporations to the births, deaths, and lives of these firms in a manner that echoes the patterns documented in studies like Dunne et al. (1988). While Owen (2002) and others have argued that the Imperial Russian incorporation process was inefficient in a number of ways, our results speak to some modicum of flexibility and competitive pressures among firms upon selection into this particular organizational form.

It was typically costlier and more time-consuming to become or dissolve a corporation than "simpler" types of firms such as partnerships or sole-proprietorships, which implies that the seemingly reasonable entry and exit rates we observe in our data are certainly lower bounds on the likely demographics of all late Imperial Russian firms. Some further evidence on this possibility is provided in Appendix Table A2, which utilizes data on *all* Russian industrial establishments observed in 1894, 1900, and 1908 to document entry and exit rates over these multi-year periods for corporate and non-corporate entities (Gregg, 2020). Corporate exit rates were an order of magnitude lower than the corresponding rate for non-corporations (.219 vs. 485 in 1894, and .317 vs. .614 in 1900), and corporate entry rates were also quite low (.252 vs. .524 in 1908), though in 1900 the corporate entry rate was quite high, given the few corporations in existence previous to that year. Thus, despite our overall portrait of a rather dynamic Russian corporate sector, data that includes all forms of enterprise shows evidence of the functionally important entry barriers asserted in works like Cheremukhin et al. (2017).

However, if weaker, politically connected firms had easier access to chartering, and these firms were also less likely to exit, then we might expect substantial factor misallocation across the industrial sector. While rich, our data are financial in nature and do not cover a number of sectors (railroads, financial firms, most of agriculture) or non-corporate firms across the sample period, and, therefore, we cannot measure the extent of the possible misallocation. Therefore, and despite the findings regarding the dynamics into, out of, and within the corporate sector that we establish, our results as also consistent with hypotheses linking costly Imperial incorporation to relatively slow economic development. This suggests that we cannot entirely reject the arguments proposed by Owen (2002) and Cheremukhin et al. (2017).

In future work, we hope to take advantage of the uniqueness of our panel of corporate balance sheet information by supplementing it with more detailed data on the internal organization of these firms (from the original charters and charter amendments), on their financial strategies (as discussed in Gregg and Nafziger, 2020), and on their real input usage and output (using the establishment data in Gregg, 2020). This will allow us to document and evaluate the linkages between governance structures, financial decisions, and outcomes like entry, exit, investment, employment, and market valuations.[52] This broader project will make important contributions towards an understanding of the corporation's role in the early stages of modern industrial development, both in Imperial Russia and in other low-income countries.

[52] Some preliminary results in this direction are presented in Table A2, which considers entry and exit among corporations with politically connected founders. We find that political connections seem to allow founders to establish slightly weaker corporations, though we see no differences in exit patterns.

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Appendix – tables and figures

Table A1 Items on the Russian balance sheet, with translations

Left hand page		Right hand page	
Счет:	Account (Total)	**Пассив**	Passive (Liabilities)
Прибылей	Revenue	Основной капитал	Share Capital
Убытков	Expenditures	Запасный капитал	Capital Reserves
		Аммортизация (sic)	Amortization (and Depreciation)
Актив	Active (Assets)	Прочие капиталы	Other Capital (Including Bonds)
Имущество	Property	Кредиторы	Accounts Payable
Товары и материалы	Goods and Materials	Прочие статьи	Other Items
Дебиторы	Accounts Receivable		
Прочие статьи	Other Items	**Прибыль**	Profit
Убыток	Loss	Общая	Net Profit
		Дивиденд: Сумма	Dividend Sum
		Дивиденд: %	Dividend Percentage

Note: These variables are generally all provided across the cross-sections of balance sheet data reported in the Ministry of Finance *Ezhegodniki*. Some small variants did exist across years – we discuss these in the text where relevant.

Table A2 Entry and exit rates by enterprise form from Gregg's (2018) factory data

Panel A: Entry rates

Year	Overall entry rate	Corporations	Non-corporations
1894	--	--	--
1900	.478	1.071	.523
1908	.539	.252	.524

Panel B: Exit rates

Year	Overall exit rate	Corporations	Non-corporations
1894	.473	.219	.485
1900	.603	.317	.614
1908	--	--	--

Note: Source: Imperial Russian Manufacturing Database (2020). These rates are calculated in the same fashion as those in Tables 3 and 4, although they pertain to factories (owned by corporations or not) rather than individual firms. Moreover, the rates in the cells refer to aggregations over 6 and 8 years, rather than year to year exits and entries. Note furthermore that these measures calculate the entry and exit of manufacturing plants, not the firms that own them.

Table A3 Percentages changes in NNP (to indicate recession years)

Year	% change in NNP in 1913 Rubles
1886	–0.022
1887	0.191
1888	–0.021
1889	–0.054
1890	0.005
1891	–0.076
1892	0.104
1893	0.152
1894	0.145
1895	–0.067
1896	0.110
1897	–0.009
1898	0.043
1899	0.077
1900	0.001
1901	0.041
1902	0.103
1903	–0.056
1904	0.122
1905	–0.096
1906	–0.032
1907	–0.019
1908	0.110
1909	0.076
1910	0.095
1911	–0.059
1912	0.107

Sources: Gregory (1982, pp. 56–7, “Variant 1”).

Table A4 Entrants vs. incumbent corporations, 1900–1913, with consistent samples

	Log total share capital				Log profit / Share capital				Log creditors / Share capital			
	OLS (1)	BE (2)	FE (3)	FE (4)	OLS (5)	BE (6)	FE (7)	FE (8)	OLS (9)	BE (10)	FE (11)	FE (12)
Entrant	–0.335*** (0.031)	–0.240*** (0.087)	0.028** (0.013)	0.058*** (0.019)	–0.404*** (0.047)	–0.386*** (0.089)	–0.135** (0.055)	–0.087 (0.082)	–0.387*** (0.048)	–0.309*** (0.115)	–0.339*** (0.043)	–0.174*** (0.063)
De Novo * entrant				–0.030 (0.032)				–0.404*** (0.144)				–0.394*** (0.118)
A-Corp. * entrant				–0.026 (0.025)				0.026 (0.107)				–0.105 (0.074)
Recession * entrant				–0.021 (0.032)				0.064 (0.118)				0.040 (0.103)
Constant	13.884*** (0.284)	13.012*** (0.673)	13.933*** (0.012)	13.933*** (0.012)	–2.776*** (0.312)	–3.474*** (1.013)	–2.112*** (0.029)	–2.111*** (0.029)	–0.843*** (0.208)	–0.791 (0.896)	–0.475*** (0.025)	–0.473*** (0.025)
Obs	13,753	13,753	13,753	13,753	11,170	11,170	11,170	11,170	13,605	13,605	13,605	13,605
R2	0.162	0.162	0.086	0.086	0.069	0.122	0.062	0.063	0.154	0.177	0.035	0.038
Ind. FE	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Region FE	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO
Firm FE	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES
N. firms	1,781	1,781	1,781	1,781	1,608	1,608	1,608	1,608	1,775	1,775	1,775	1,775

Note: *** p<0.01, ** p<0.05, * p<0.10. Robust standard errors in parentheses, except in columns 2, 6, and 10, where standard errors are in parentheses. The variable "Entrant" denotes whether a firm in period *t* was a new entrant, compared to *t – 1*. Industry controls are a set of dummies covering 14 industries (see Table 4). Year controls are for the accounting year of the associated corporate data. Region controls indicate the location of the corporate headquarters in one of 14 macro-regions, including Poland, Finland, and abroad. The "Recession" variable equals 1 for years in which the growth rate of NNP (See Table 4) is negative: 1903, 1905, 1906, 1907, and 1911 (and zero otherwise).

Table A5 Exiting corporations vs. incumbent corporations, 1900–1913

	Log total share capital				Log profit / Share capital				Log creditors / Share capital			
	OLS (1)	BE (2)	FE (3)	FE (4)	OLS (5)	BE (6)	FE (7)	FE (8)	OLS (9)	BE (10)	FE (11)	FE (12)
Exiting	–0.009	0.396***	–0.037**	–0.000	–0.026	0.378***	–0.052	–0.228***	0.075	0.037	0.083**	–0.168**
	(0.031)	(0.069)	(0.017)	(0.025)	(0.048)	(0.076)	(0.050)	(0.076)	(0.045)	(0.096)	(0.035)	(0.070)
A-Corp. *exiting				0.009				0.259***				0.224***
				(0.031)				(0.090)				(0.078)
Recession *exiting				–0.211***				–0.423**				0.279**
				(0.065)				(0.202)				(0.111)
Log Age	0.190***	0.299***			0.210***	0.294***			0.119***	0.116***		
	(0.008)	(0.026)			(0.010)	(0.026)			(0.011)	(0.036)		
Constant	12.503***	12.056***	13.932***	13.935***	–3.741***	–4.670***	–2.088***	–2.078***	–1.146***	–1.040	–0.629***	–0.466***
	(0.110)	(0.456)	(0.013)	(0.013)	(0.145)	(0.651)	(0.036)	(0.037)	(0.147)	(0.702)	(0.030)	(0.032)
Obs	17,511	17,511	17,512	13,753	13,745	13,745	13,746	11,316	17,281	17,281	17,282	13,828
R2	0.172	0.166	0.061	0.089	0.092	0.138	0.069	0.063	0.162	0.169	0.024	0.028
Ind. FE	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Region FE	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO
Firm FE	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES
N. firms	2,646	2,646	2,646	1,781	2,295	2,295	2,295	1,749	2,627	2,627	2,627	1,985

Note: *** p<0.001, ** p<0.01, * p<0.05. Robust standard errors in parentheses, except in columns 2, 6, and 10, where standard errors are in parentheses. "BE" denotes panel between effects estimates, and "FE" denotes fixed effects regressions, i.e. panel regressions with firm fixed effects. The variable "exiting" denotes whether a firm in period *t* ceased to be recorded in the balance sheet data, compared to *t – 1*. Industry controls are a set of dummies covering 14 industries (see main text Table 4). Year controls are for the accounting year of the associated corporate data. Region controls indicate the location of the corporate headquarters in one of 14 macro-regions, including Poland, Finland, and abroad. The "Recession" variable equals 1 for years in which the growth rate of NNP (See Table 4) is negative: 1903, 1905, 1906, 1907, and 1911 (and zero otherwise)

Table A6 Firm characteristics over the corporate life cycle, 1900–1913

	Log revenue			Log profit			Market share		
Firm is	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1 year old	–1.215***	–0.730***	–0.200***	–0.135***	–0.077	0.065	–0.012***	–0.008***	–0.000
	(0.071)	(0.092)	(0.072)	(0.038)	(0.052)	(0.062)	(0.002)	(0.002)	(0.002)
2 years	–0.496***	–0.277***	–0.034	–0.063***	–0.040	0.036	–0.005***	–0.004***	–0.000
	(0.032)	(0.039)	(0.031)	(0.022)	(0.027)	(0.030)	(0.001)	(0.001)	(0.001)
3 years	–0.289***	–0.160***	–0.012	–0.030*	–0.019	0.026	–0.003***	–0.002***	0.000
	(0.022)	(0.026)	(0.019)	(0.016)	(0.019)	(0.018)	(0.000)	(0.000)	(0.000)
4 years	–0.168***	–0.093***	0.003	–0.033***	–0.023*	–0.000	–0.002***	–0.002***	–0.000
	(0.015)	(0.018)	(0.012)	(0.013)	(0.014)	(0.014)	(0.000)	(0.000)	(0.000)
5 years	–0.101***	–0.053***	0.006	–0.025**	–0.017	–0.006	–0.001***	–0.001***	–0.000
	(0.014)	(0.015)	(0.008)	(0.011)	(0.012)	(0.011)	(0.000)	(0.000)	(0.000)
Constant	10.770***	10.808***	13.327***	–3.772***	–3.744***	–2.444***	0.166***	0.166***	0.106*
	(0.246)	(0.242)	(0.670)	(0.161)	(0.160)	(0.289)	(0.024)	(0.024)	(0.057)
N	8,853	8,853	8,853	13,745	13,745	13,745	8,853	8,853	8,853
R2	0.169	0.190	0.016	0.037	0.040	0.061	0.186	0.192	0.123
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Ind. FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Cohort FE	NO	YES	NO	NO	YES	NO	NO	YES	NO
Firm FE	NO	NO	YES	NO	NO	YES	NO	NO	YES
Num of firms	1,703	1,703	1,703	2,295	2,295	2,295	1,703	1,703	1,703

Note: *** p<0.001, ** p<0.01, * p<0.05. Robust standard errors in parentheses. The dependent variables are denoted above the columns. We add one to revenues before logging and utilize this adjustment in calculating market shares (of total sectoral revenue). The row variables are dummies for corporations of that age. The omitted category is corporations older than 5 years. Cohort dummies are included for entry cohorts in years 1895–1913.

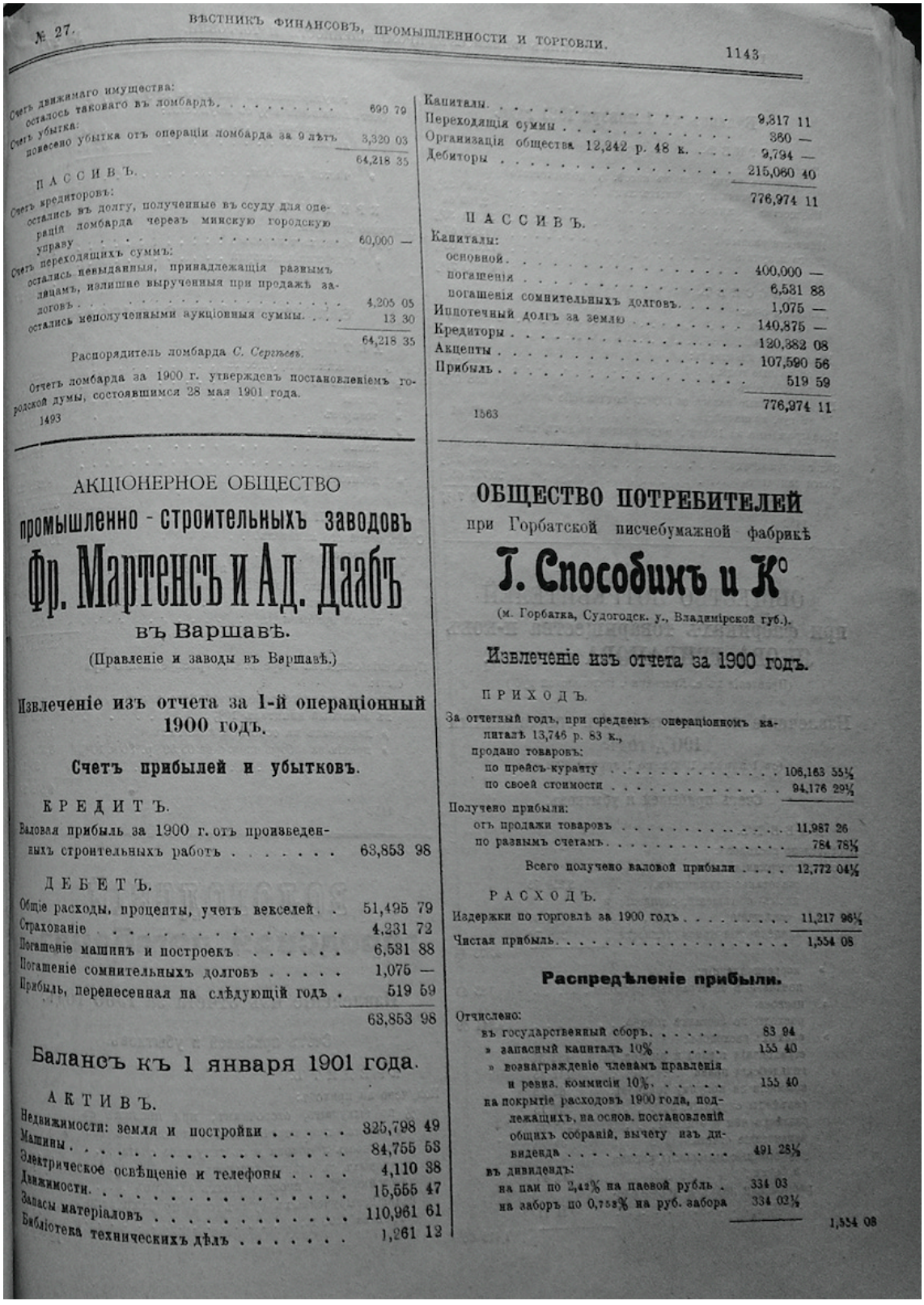
Table A7 Firm characteristics over the corporate life cycle, 1900–1913

	Log revenue		Log profit		Market share	
Firm is	New (1)	Transformed (2)	New (3)	Transformed (4)	New (5)	Transformed (6)
1 year old	–1.320***	–0.719***	–0.741***	–0.025	–0.025***	–0.006***
	(0.257)	(0.134)	(0.157)	(0.069)	(0.006)	(0.002)
2 years	–0.554***	–0.297***	–0.333***	–0.004	–0.012***	–0.003***
	(0.114)	(0.062)	(0.084)	(0.037)	(0.003)	(0.001)
3 years	–0.344***	–0.150***	–0.119**	0.012	–0.007***	–0.002***
	(0.078)	(0.039)	(0.047)	(0.024)	(0.002)	(0.001)
4 years	–0.225***	–0.100***	–0.063*	–0.008	–0.005***	–0.001***
	(0.055)	(0.028)	(0.033)	(0.019)	(0.001)	(0.001)
5 years	–0.190***	–0.048**	–0.057**	–0.011	–0.003***	–0.001
	(0.048)	(0.022)	(0.027)	(0.015)	(0.001)	(0.001)
6 years	–0.132***	–0.067***	–0.064***	–0.019	–0.003***	–0.001***
	(0.037)	(0.018)	(0.025)	(0.014)	(0.001)	(0.000)
7 years	–0.067**	–0.035**	–0.029*	–0.026**	–0.003***	–0.000
	(0.028)	(0.015)	(0.017)	(0.012)	(0.001)	(0.000)
8 years	–0.036	–0.028**	–0.016	–0.013	–0.001*	–0.001***
	(0.025)	(0.013)	(0.017)	(0.009)	(0.001)	(0.000)
9 years	–0.052**	–0.022*	–0.020	–0.019**	–0.001	–0.000
	(0.025)	(0.011)	(0.016)	(0.009)	(0.001)	(0.000)
10 years	–0.026	–0.009	–0.022*	–0.005	–0.001	–0.000
	(0.025)	(0.011)	(0.012)	(0.007)	(0.001)	(0.000)
Constant	10.984***	10.783***	–3.577***	–4.020***	0.178***	0.131***
	(0.376)	(0.338)	(0.204)	(0.183)	(0.044)	(0.023)
N	2,082	5,223	2,903	8,288	2,082	5,223
R2	0.214	0.200	0.101	0.044	0.225	0.204

Note: *** p<0.01, ** p<0.05, * p<0.10. Robust standard errors in parentheses. The dependent variables are denoted above the columns. We add one to revenues before logging and utilize this adjustment in calculating market shares (of total sectoral revenue). The row variables are dummies for corporations of that age. The omitted category is corporations older than 15 years. Regressions do not include firm fixed effects. Cohort dummies are included for entry cohorts in years 1890–1913. All regressions include year, industry, and cohort dummies.

Figure A1 Excerpts from Vestnik Finansov i torgovli and Ministry of Finance Yearbook for the Partnership of Martens and Daab (1900–01 Accounting Year)

Panel A: *Vestnik Finansov, Otcheti,* 1902, p. 1143



№ 27. ВѢСТНИКЪ ФИНАНСОВЪ, ПРОМЫШЛЕННОСТИ И ТОРГОВЛИ. 1143

Счетъ движимаго имущества:
остались таковаго въ ломбардѣ 690 79
Счетъ убытка:
понесено убытка отъ операціи ломбарда за 9 лѣтъ 3,320 03
64,218 35

ПАССИВЪ.

Счетъ кредиторовъ:
остались въ долгу, полученные въ ссуду для операцій ломбарда черезъ минскую городскую управу . . . . . 60,000 —
Счетъ переходящихъ суммъ:
остались невыданныя, принадлежащія разнымъ лицамъ, излишне вырученныя при продажѣ заложенныхъ 4,205 05
остались неполученными аукціонныя суммы. . . . 13 30
64,218 35

Распорядитель ломбарда *С. Сергѣевъ.*

Отчетъ ломбарда за 1900 г. утвержденъ постановленіемъ городской думы, состоявшимся 28 мая 1901 года.

1493

Капиталы 9,817 11
Переходящія суммы . . . . . 360 —
Организація общества 12,242 р. 48 к. . . . 9,794 —
Дебиторы 215,060 40
776,974 11

ПАССИВЪ.

Капиталы:
основной . . . . . 400,000 —
погашенія 6,581 88
погашенія сомнительныхъ долговъ. . . . 1,075 —
Ипотечный долгъ за землю . . . . . 140,875 —
Кредиторы 120,382 08
Акцепты 107,590 56
Прибыль 519 59
776,974 11

1563

АКЦІОНЕРНОЕ ОБЩЕСТВО
промышленно - строительныхъ заводовъ
Фр. Мартенсъ и Ад. Даабъ
въ Варшавѣ.
(Правленіе и заводы въ Варшавѣ.)

Извлеченіе изъ отчета за 1-й операціонный 1900 годъ.

Счетъ прибылей и убытковъ.

КРЕДИТЪ.

Валовая прибыль за 1900 г. отъ произведенныхъ строительныхъ работъ 63,853 98

ДЕБЕТЪ.

Общіе расходы, проценты, учетъ векселей . 51,495 79
Страхованіе 4,231 72
Погашеніе машинъ и построекъ 6,531 88
Погашеніе сомнительныхъ долговъ . . . . . 1,075 —
Прибыль, перенесенная на слѣдующій годъ . 519 59
63,853 98

Балансъ къ 1 января 1901 года.

АКТИВЪ.

Недвижимости: земля и постройки 325,798 49
Машины 84,755 53
Электрическое освѣщеніе и телефоны 4,110 38
Движимости 15,555 47
Запасы матеріаловъ 110,961 61
Библіотека техническихъ дѣлъ 1,261 12

ОБЩЕСТВО ПОТРЕБИТЕЛЕЙ
при Горбатской писчебумажной фабрикѣ
Т. Способинъ и К°
(м. Горбатка, Судогодск. у., Владимірской губ.).

Извлеченіе изъ отчета за 1900 годъ.

ПРИХОДЪ.

За отчетный годъ, при среднемъ операціонномъ капиталѣ 13,746 р. 83 к.,
продано товаровъ:
по прейсъ-куранту 106,163 55½
по своей стоимости 94,176 29½
Получено прибыли:
отъ продажи товаровъ 11,987 26
по разнымъ счетамъ 784 78½
Всего получено валовой прибыли 12,772 04½

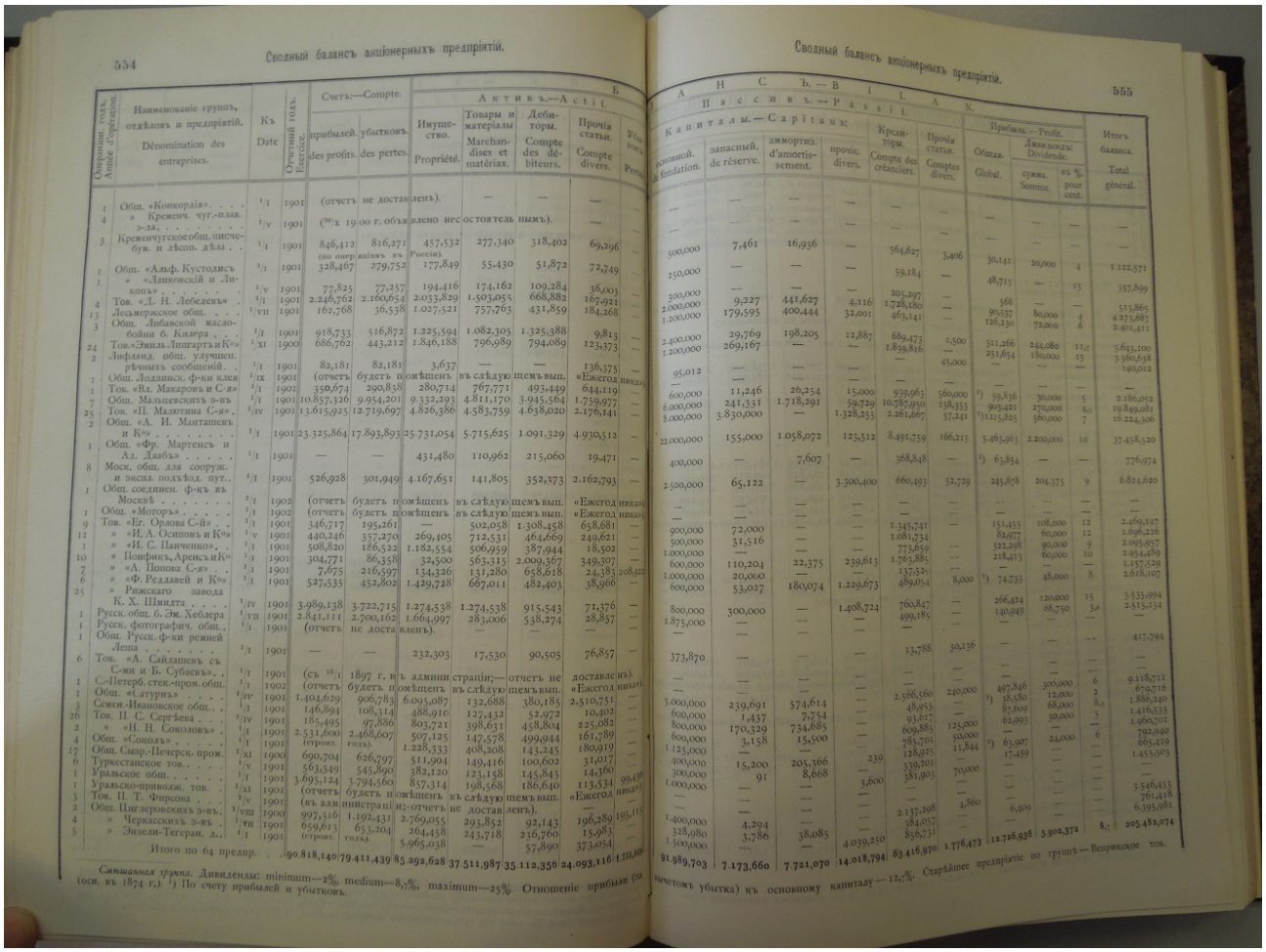
РАСХОДЪ.

Издержки по торговлѣ за 1900 годъ 11,217 96½
Чистая прибыль 1,554 08

Распредѣленіе прибыли.

Отчислено:
въ государственный сборъ 83 94
» запасный капиталъ 10% 155 40
» вознагражденіе членамъ правленія и ревиз. коммиссіи 10% 155 40
на покрытіе расходовъ 1900 года, подлежащихъ, на основ. постановленій общихъ собраній, вычету изъ дивиденда 491 28½
въ дивидендъ:
на паи по 2,42% на паевой рубль . 334 03
на заборъ по 0,752% на руб. забора 334 02½
1,554 08

Panel B: Ezhegodnik Ministerstva Finansov, 1902



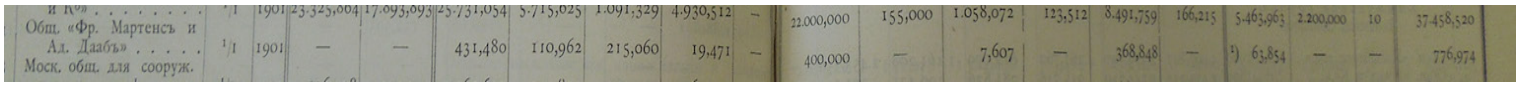
Сводный балансъ акціонерныхъ предпріятій.

554

Сводный балансъ акціонерныхъ предпріятій.

555

Панель C: Zoomed in row for Martens and Daab



Additional details on the dataset: Original sources and variables

The balance sheets reported in the Ministry of Finance's *Yearbooks* serve as this paper's key data source. Those balance sheets span two facing pages, where the left side is labeled "Active" and the right side "Passive" (See Figure A1 Panels B and C). The Ministry of Finance collected and organized this information from financial reports published in an official financial newspaper, the *Vestnik finansov* (tr. "Herald of Finance;" see the example in Figure A1 Panel A).

The "Active" items reported on the left-hand page roughly correspond to the "assets" side of a common modern balance sheet. For example, "Active" items included property (real and personal), goods and materials (inventories), accounts receivable, other items, and a "loss" column that likely allowed for rounding and other error. In addition to assets, the left-hand page included measures of the company's total annual revenue and expenses. The right-hand page included liabilities ("passive" items) such as share capital, reserves, other capital, accounts payables, and other items as well as some additional measures of performance such as profits (from which the company paid dividends) and measures of the company's dividends paid.

Reconciling duplicate observations in the panel dataset

Matching corporations over time yielded a small number of duplicate observations, which we reconcile as follows. First, we noted several instances of separate balance sheet entries for subdivisions of a company's activities; for example, balance sheet information for the company's factory in Moscow. Such observations begin with the words "Same for…" (*Tozhe)*. We dropped these subsidiary observations, because it appears that their information is included in the total balance for the whole company.

Second, some companies' balance sheets for a given accounting year are reported in two or more different published volumes. Usually, the entries across volumes are identical, but in some cases, there are small differences, and in others, only one published volume includes certain entries. We believe that repeated reporting of balance sheets for the same accounting year represent revisions and corrections. Thus, when a company's accounts for the same accounting year are reported in two or more published volumes, we take the latest observation.

Third, some companies are reported several times within the same published volume across multiple industries, with identical balance sheet numbers reported in each repeated entry. In such cases, we consolidate the information into one single entry for what appears to be the primary industry and then drop the other observations. For companies reported in different industries with totally different balance sheet entries that have been assigned the same firm identifier, we generate

a new unique firm id for each one. There are very few corporations (less than 1% of the total sample) that fit this category.

Comparison with entry and exit rates in manufacturing data

Table A2 presents a rough comparison between the entry and exit rates for corporations and firms of other enterprise form types, calculated from an external source, the Imperial Russian Manufacturing Database published alongside Gregg (2020). The table reveals that, in Imperial Russia in this period, all kinds of firms had relatively high entry and exit rates, but corporations had much lower entry and exit rates than their non-corporate peers, which reflected the high cost of entry for corporations. In one year, however, from 1894 to 1900, corporations had a higher entry rate than non-corporations. This high entry rate likely reflects how few corporations existed in 1894.

Recession years

For several analyses in the paper, we consider differences across firms operating or founded in "recession" years, which define as years in which the percentage change in Gregory's (1982) measure of Net National Product is negative. We list these figures for the years in which we have entry and exit data in Table 4 of the main text. Table A3 lists the complete set of percentage changes for all years in Gregory's volume. We use these years to define the "born in recession year" variable used in Table 8 (they are also listed in the note below Table 4).

Robustness checks: Additional results describing firm entry, exit and evolution

The final appendix tables, Tables A4 through A7, present supplementary results to those presented in the main text. We begin with Table A4, which replicates our results from Table 6 but constrains the sample to the smaller subset present in columns 4, 8, and 12, respectively. The results are almost identical to those presented in Table 6, though the coefficient on Entrant in column 3 is now statistically significant at the .05 level, and some coefficients are larger in absolute value.

Table A5 supplements our results describing firm exit. In the main text, we estimate the correlation between a firm's fixed and varying characteristics and its likelihood of exit using a Cox proportional hazard model. Here, we instead examine how firms differ in their final years of existence using an OLS and panel regression framework, similar to the regressions presented in main text Table 6. The regressions focus on differences across three dependent variables: log share capital, log profits scaled by share capital, and log credit scaled by share capital. Additionally, when firm fixed effects are not included, we control for a firm's age, since age is strongly correlated with probability of exit.

Columns 1 through 4 examine how persisting and exiting firms differ in size, as measured by log total share capital. Column 1 shows that, overall, and while controlling for age, industry, and region, corporations in their last year of life tended to be small, though the difference is small and noisy. Older firms tended to be robustly larger. The OLS regression presented in column 1 simultaneously presents differences between corporations that exit any time in the sample vs. those that persist and differences between corporations in their last year of life compared to other observations of that sample corporation. Thus, we attempt to disentangle these "between" and "within" differences in columns 3 and 4. In both cases, however, corporations in their final year of existence in the dataset are smaller. Column 4 shows no apparent size difference between the two corporation types in their year of exit. However, there are some interesting differences for corporations exiting during a recession year. Such corporations tended to be smaller, less profitable, and more heavily in debt than exiting corporations in a non-recession year. Perhaps such corporations are able to limp along during normal times, but recessions create shake out, consistent with a model of creative destruction or the "cleansing" effect of recessions (e.g., Caballero and Hammour 1994).

We repeat these exercises similarly for two additional outcome variables: log profit over share capital and log credit over share capital. Columns 5 though 8, show that, similarly to the results presented for the cox proportional hazard model, corporations in their final year of life are less profitable. Though, this negative result is only statistically significant in the fixed effects regression in Column 8 that also includes an interaction with corporation type. In fact, A-corporations that exit tend to be larger, perhaps suggesting that A-corporations are more fragile overall, since A-corporations seem to have a higher profit cutoff for exit. Corporations in their final year of existence also appear to have more credit compared to other corporations (Column 11), and A-corporations have more credit on average (Column 12).

Next, Table A6 presents a robustness check for main text Table 6 that includes fewer year dummies as a check on functional form. We find essentially the same result as presented in Table 7: Differences between new and existing corporations in revenue, profits, and market share tend to disappear over time, though the results for profits with both models and for market share when fixed effects are included have become much noisier.

Finally, Table A7 presents similar results to those presented in main text Table 7, but we have split the sample to present separate regressions for corporations that were transformed from existing partnerships ("transformed) versus those created de novo ("new"). Because corporations that already existed as partnerships had experienced a process of positive selection prior to incorporation, we expect such corporations to show smaller differences relative to incumbent firms compared to those that are truly new. The regressions in Table A7 largely confirm this hypothesis: in

terms of size (log revenue), profitability, or market share, the new corporations show smaller initial differences compared to incumbents and take longer to "catch up."

References

Caballero, Ricardo and Mohamad L. Hammour. "The Cleansing Effects of Recessions" American Economic Review 84.5 (1994): 1350–68.

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