

The Historical Evolution of Financial Exchanges

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Abstract

The historical dynamics of financial exchange formation and closure are analyzed for a sample of 19 countries from 1855 through 2010. We focus on the economic, technological, and regulatory factors that jointly determine the observed pattern of financial exchanges and whether those factors are consistent with existing financial theories in a time-series setting. The results suggest waves of formation and closure primarily driven by underlying structural change, not business-cycle fluctuations. We find that exchange births are positively correlated with economic growth and commodity booms, while closures are associated with advances in communications technology, such as telephone and the Internet, and heightened regulation, such as the 1934 Securities Exchange Act and state-level blue sky laws in the United States and the 1963 Stock Transfer Act in the United Kingdom.

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1 Introduction

The past two decades have witnessed dramatic changes in the number, location, and structure of global financial exchanges. The number of new financial exchanges has surged worldwide in countries such as Russia and China¹, that previously did not have any exchanges as well as in countries with many competing established exchanges and mature domestic financial markets (e.g. the BATS Exchange in the United States and Chi-X in the United Kingdom). The number of cross-border and trans-Atlantic exchange mergers has increased in recent years. Additionally, new liquidity providers have emerged since 2000 as the Internet provides a low-cost open platform for alternative trading systems to compete with more traditional exchanges.²

This proliferation of newly formed financial exchanges and alternative trading systems, runs counter to predictions that economies of scale will continually force exchanges to consolidate as technology places an emphasis on cost minimization; specifically, exchanges that better attract order flow will lower their marginal costs and generate more liquid markets relative to their competitors. Indeed, the recent acceleration of exchange mergers provides support for theories of consolidation in the industry.³ Given the contradictory motives faced by financial exchanges - their desire to expand into new markets on one hand, and their quest for efficiency and economies of scale on the other - it is natural to question how exchanges will adapt going forward. Any assessment of the future of exchanges must be made in the context of their evolutionary history.

In this paper, we construct a novel panel dataset for financial exchanges and provide new long-run historical evidence on the exchange industry. We investigate the historical evolution of financial exchanges within a sample of 19 countries to better understand the forces driving exchange formation and consolidation. Specifically, we document the evolutionary pattern of the number of exchanges (and net exchange formation, that is, births minus closures in a given year) as well as births and closures across sample countries.⁴ We test the dual hypotheses that after controlling for the relevant exogenous factors, (1) exchange formation is concentrated in periods of uncertainty and capital investment, and (2) exchange closures occur during periods of increased regulation and emerging communications technology. In testing the validity of these conjectures, the goal is to better understand the patterns and commonalities in exchange evolution across

¹For recent Chinese examples, see the China Financial Futures Exchange (opened 2006) and the Hong Kong Mercantile Exchange (2008). Excluding Hong Kong, securities markets did not exist in China thirty years ago, see Weber, Davis and Lounsbury (2009) for additional insights.

²Examples of alternative trading systems include: electronic communication networks (ECNs) such as Archipelago (opened 1997), Instinet (1969), and Island/INET (1996), and crossing networks such as the Arizona Stock Exchange (1992), OptiMark (1999), and WIT Capital (1997).

³For example, American Stock Exchange - NYSE Euronext and Philadelphia Stock Exchange - NASDAQ OMX mergers in the US. For additional detail see Arnold, Hersch, Mulherin and Netter (1999) which studies the effect of US regional stock exchange mergers on order flow.

⁴Throughout the paper, the term “closures” is defined as the sum of exchange deaths and mergers. The term “exchange death” is defined as the permanent shutdown of an exchange due to prevailing market conditions, not a merger or buyout; that is, the exchange halts trading and its assets are liquidated.

countries. Our hope is that this knowledge will provide historical perspective and context, which will aid interpretation of recent developments in global financial markets.⁵

Our results suggest that the number of exchanges neither consistently expands nor contracts. Rather, history shows occasional bursts of exchange formation, which are associated with periods of intense financial speculation, and subsequent waves of exchange consolidation, which are positively correlated with periods of technological or regulatory change. Business cycles also influence the time path of exchanges but only weakly, whereby economic expansion (contraction) is associated with exchange formation (closure). In a cross-country analysis of exchange closure, we find that increased regulation and technological advances in long-distance communication, such as the telephone and the Internet, coincide with a decrease in the aggregate number of exchanges. Our findings are consistent with a role for start-up exchanges to distinguish viable firms/securities and resolve ambiguity during periods of elevated uncertainty. This suggests that, contrary to existing theories in finance, the number of exchanges worldwide will fluctuate depending on the prevailing global economic environment.

The remainder of the paper is organized as follows. Section 2 reviews the relevant literature in finance. Section 3 provides theoretical background and justifies our hypotheses. Section 4 describes the data collection methodology and the resulting dataset on exchanges used throughout the paper. Section 5 discusses the results. Section 6 concludes. Sections 7 and 8 contain figures and tables, respectively. The appendix provides a list of the exchanges in our dataset by country, as well as a list of sources.

2 Literature Review

Financial theory predicts consolidation within the market to provide liquidity. Macey and O’Hara (1999), Pirrong (1999), and Hasan and Malkamaki (2001) argue that technology places an emphasis on cost minimization, which forces financial exchanges to consolidate to exploit economies of scale. Exchanges that can attract incremental order flow will lower their costs at the margin, thus reducing trading costs for market participants and in turn further attracting even more order flow. According to these arguments, fragmentation of order flow among competing exchanges should be a temporary phenomenon associated with newly-developed financial markets or emerging economies.

While a natural starting point for our analysis is the literature on the history of financial exchanges in various countries around the world, the existing literature does not explicitly address the economic factors that drive exchange formation and closure.⁶ Prior research most closely related to our analysis includes

⁵Regulators in the United States express concerns that the US capital markets are falling on a number of dimensions, including IPO activity and the volume of trade, see Doige, Karolyi and Stulz (2011), among others.

⁶For example, see Salsbury and Sweeney (1988), Australia; Armstrong (1997), Canada; Michie (1981), UK; Sears (1973), US.

(1) Cole (1944), on the number of regional stock exchanges prior to the Securities Exchange (SEC) Act of 1934; (2) Angel (1998), on the lifespan of a number of US regional exchanges since the SEC Act of 1934; (3) Arnold, Hersch, Mulherin, and Netter (1999), on the distribution of trading volume surrounding closures and mergers among nine US regional exchanges from the 1930s through the 1990s; (4) Chabot (1999), on the extent of market integration from 1865 to 1885 for major stock exchanges of the United Kingdom and United States; and (5) Jorion and Goetzmann (1999), on the equity premium in the context of international equity markets from 1920 to 1996.⁷ When comparing our analysis to the prior literature, a particular insight stands out: there were substantially more local and regional exchanges than previously acknowledged.

A burgeoning literature, although tangentially related to the evolution of financial exchanges, documents the observed positive correlation between the degree of capital market development and economic growth. Research in this area attempts to determine the causal direction of the link between financial market development and economic growth. Early work in this literature includes Greenwood and Jovanovic (1990), Levine (1991), King and Levine (1993), and others.

3 Theoretical Framework

The life-cycle of a financial exchange, from formation to closure, is a dynamic process which is potentially influenced by many factors. In this section, we develop hypotheses regarding specific factors that affect the number of exchanges as well as exchange births and closures: macroeconomic fluctuations and the need for efficient capital allocation, periods of resource exploration and discovery associated with heightened uncertainty, advances in communications technology, and shifts in regulatory regimes. We discuss each in turn.

As discussed in the literature review, economic growth and financial market development are positively correlated. Financial exchanges facilitate the flow of capital into high-growth sectors by redirecting funds from other (less productive) sectors of the economy. We conjecture that economic expansion (contraction) is associated with increased exchange formation (closure) as firms demand more (less) capital for their operations, which in turn increases (decreases) the demand for trading services. While the potential linkage of exchange formation with economic expansion is intuitive, the timing, or more specifically the frequency of business cycle fluctuations, is likely to be important in a model setting.

We consider two possible time horizons for the link between financial exchange formation and economic growth. At the highest frequency is the set of business cycles which identify periods of expansion and

⁷A substantial literature reconstructs and analyzes historical stock market indices in various countries; see Jorion and Goetzmann (1999) for references. This line of research focuses on stocks traded and recorded on the major exchanges in a country and does not provide information on smaller competing exchanges.

contraction within a country's economy. These can be as short as a single quarter. Within our framework, expansions are associated with exchange formation, while recessions are associated with exchange closure. Since exchange formation and closure events are costly long-term decisions, business cycle fluctuations pass too quickly to influence the underlying dynamics.

Consequently, we also investigate the relationship between the start of the Industrial Revolution and the evolution of exchanges. The transition from a predominantly agrarian economy to a predominantly industrial one creates an ever-expanding need for the capital and transaction services supplied by exchanges. We hypothesize that the Industrial Revolution is positively (negatively) correlated with exchange formation (closure) as the newly-formed exchanges help growing companies obtain capital and enable firm expansion.⁸ Investors, searching for opportunities to diversify away from agriculture and trans-Atlantic shipping, are a primary driver of demand for shares in newly-formed manufacturing firms under this hypothesis. Conventional historical dating of the Industrial Revolution places its start between 1780 and 1830, with the onset differing across countries, and thus ahead of the vast majority of our sample; almost all of the exchanges that we have documented opened after 1850. As a result, we can conjecture as to the importance of the Industrial Revolution in driving exchange formation, but this paper cannot provide empirical evidence beyond informal correlations: more than 95% of recorded exchanges were formed in a post-Industrial Revolution context. Nevertheless, we maintain the purely theoretical claim that the Industrial Revolution matters for exchanges.

Financial exchanges did exist before the start of the Industrial Revolution. Despite the fact that exchanges were in place to facilitate the raising of capital, many new exchanges were formed during the era of the Industrial Revolution. The timing of this proliferation suggests that existing exchanges could not, or would not, facilitate trade associated with the industrial expansion. If exchanges were solely anonymous providers of transaction services without reputation effects, then this observation would be logically inconsistent since it is unlikely that existing exchanges were operating near maximum capacity at the start of the Industrial Revolution. This puzzle motivates our next hypothesis concerning the formation of exchanges during periods of heightened uncertainty.

We argue that financial exchanges provide more than transaction services; specifically, they supply implicit certification of actively traded securities. The reputation of an exchange provides the basis for market participants to trust the information, trades, and counterparties they deal with on the exchange; this concept is similar to the reputation effects discussed in Edelen and Gervais (2003). While existing exchanges would always like to trade more securities to exploit economies of scale in trading volume, an exchange may refrain

⁸In a more general model, the Industrial Revolution variable would be country-specific (depending on the historical record) to exploit the panel dimension of the full dataset.

from doing so, absent further information about the security, because the cost of trading a fraudulent security is primarily borne by all other securities traded on the exchange. In this case, the benefit of additional trading volume is more than offset by the potential long-run reputational cost due to the negative externality of fraud.

When existing financial exchanges choose not to trade new securities, an opportunity arises for entrant exchanges. An entrant can step in to provide liquidity and transaction services for market participants willing to trade the new risky securities. By facilitating trade in the new securities, an entrant can help to identify viable securities for incumbent exchanges to trade without the older exchanges having to risk paying a reputational cost due to fraud.⁹ We argue that the role of entrant exchanges is particularly critical during periods of extreme uncertainty that often accompany dramatic changes in the set of investment opportunities. Specific historical examples include periods such as the California Gold Rush (1848–1855) and the American Internet boom (1995–2000), which saw the formation of many new firms whose viability was uncertain. Therefore, we conjecture that exchange births (closures) are likely to increase (decrease) during periods characterized by heightened uncertainty in the valuation of firms.

One of the fundamental tasks of any financial exchange is to match the trading interests of buyers and sellers. Operationally, this involves both the buyer and seller communicating their trading intent to the exchange and the exchange matching the purchase and sell orders. Thus, the ease with which market participants and the exchange can communicate, both in terms of time and cost, is likely to impact the productivity and overall efficiency of an exchange's trading operations. Indeed, before the development of mass near-instant communication, new exchanges were typically located at or near the site of the risky asset being priced, due to transportation and communication costs. An example is an exchange located adjacent to a panning stream that trades claims to an uncertain amount of gold; we observe this type of behavior in the data. We hypothesize that advances in communications technology should decrease exchange formation and increase exchange closures. New communications technologies allow trade to occur from more remote locations, and thus the need for specialized local exchanges to facilitate trade wanes.

Witness the Hartford Stock Exchange in Connecticut. It closed within two weeks of the telegraph starting to operate between Hartford and New York City. Swedish and Norwegian historians have also noted that the emergence of the telegraph removed local demand for specialized financial exchanges. These exchanges disappeared first from smaller towns with less trading volume, and later from larger towns until a single exchange remained in the capital of those countries. Furthermore, prior to the introduction of efficient long-distance communication, exchange mergers and alliances were only feasible if the exchanges were close

⁹In other words, the purpose of upstart exchanges is to separate fraudulent securities from legitimate ones. Therefore, it is not surprising to observe that most securities fraud takes place on newer exchanges (relative to trading volume).

to each other. Therefore, advances in communications are likely to increase the probability of exchanges merging or forming alliances independent of distance; as evidence, note the acceleration in exchange merger activity over the past decade, including the combination of NASDAQ and OMX.

The regulatory environment is another factor to consider when discussing the evolution of financial exchanges. At first glance, the direction of the net effect is indeterminant. On one hand, regulation may ultimately increase the viability of exchanges that can comply with the increased regulatory burden by creating a stable environment for them to operate in. On the other hand, regulation, at least at the implementation phase, may force some exchanges to close or merge if they cannot or will not comply with the imposed requirements. For example, after the implementation of the US Securities Exchange Act of 1934, which gave jurisdiction of exchange oversight to the Securities and Exchange Commission, many exchanges voluntarily closed rather than submit to a review by the newly-formed regulator. Similarly, regulation may inhibit market entry by start-ups as the compliance hurdle rises in a regulated environment relative to *laissez-faire*. We hypothesize that regulatory oversight is associated with a decrease in exchange formation, with an ambiguous effect on closures (an increase in closures at the beginning of the regulatory period, but a decrease after implementation and enforcement).¹⁰

We believe that macroeconomic fluctuations, periods of uncertainty, communication advances, and enhanced regulation summarize the primary factors that influence exchange evolution. However, we acknowledge that we are excluding other factors that may affect the number, formation, and closure of financial exchanges. Major military conflicts such as World War I and World War II, for example, halted exchange formation and led to temporary suspensions of trading and increased the number of exchange closures.¹¹ During such conflicts, centralized war planning can lead to a reduced need for capital reallocation within an economy. Thus the need for the trading services provided by exchanges abates.

4 Data

Our financial exchange data consist of the formation and closure dates that we could confirm for the exchanges identified in our sample of 19 countries: Australia, Belgium, Canada, Chile, China, France, Germany, Ireland, Italy, Japan, the Netherlands, Norway, Singapore, Spain, Sweden, Switzerland, Taiwan, the United Kingdom, and the United States. See the appendix for a comprehensive list of exchanges in the

¹⁰Note that we are not asking research questions about the quality (or trading volume) of exchanges, only their quantity. Regulation is likely to increase exchange quality among the survivors, but for our purposes, this is unobservable in historical data. The assertion that regulation increases exchange quality is empirically untestable given the data incompleteness problem that we face.

¹¹Data are often unavailable or of poor quality during military conflicts. In compiling our dataset, we occasionally observe temporary closures due to local or global wars, i.e. World War II, and the data that are available are not systematic enough to support war dummies in the model.

sample and their respective formation, ending and merger dates (if known) as well as our sources. We define an exchange as any formal organization whose objective is to facilitate trade and economic activity through the pricing and trading of uncertain, inherently risky claims.¹²

Our data on financial exchanges are hand-collected from various historical sources. To start, we identify currently-operating exchanges based on the list in Clayton, Jorgensen, and Kavajecz (2005) as well as the *Handbook of World Stock, Derivative and Commodity Exchanges* (2001). When possible, we verify operational status by viewing the exchange’s website.¹³ Typically, contemporary exchanges make their historical information publicly available, which provides us with formation and merger dates along with merger partners. This is our first option for identifying defunct exchanges; these sources, however, provide only merger dates and not formation dates for absorbed merger partners.

After exhausting the available information derived from active financial exchanges, we then examined inactive and defunct exchanges. Multiple data sources provide historical information on exchanges. Some sources yield direct positive (formation) or negative (closure) outcomes, while others provide indirect evidence of operational status at a particular date without explicitly listed formation or closure dates. While these sources identify a large number of defunct exchanges, the information they provide on formation and closure dates is often incomplete. In some cases, a source makes reference to an exchange, so we know that the exchange existed, but provides no formation or closure dates. We began with the strongest sources that confirm the formation or closure of an exchange. Country-specific historical records are particularly helpful in gathering this information, for example, Armstrong (1997) for Canada, Michie (1986) for the United Kingdom, Salsbury and Sweeney (1988) for Australia, and Sears (1973) for the United States. These sources, however, suffer from a common bias: exchange formation dates are reported much more frequently than closure dates because the popular press typically covers celebratory exchange openings and overlooks unceremonious closures.¹⁴

To further address data incompleteness, we next examine historical print media. Specifically, we searched the electronic versions of *The New York Times*, *The Wall Street Journal*, and *The Washington Post* as far back as 1850 for any reference of a financial exchange. The procedure involved database queries with keywords such as “exchange,” “trading,” and so on. The results add a number of entries to our dataset; however, as would be expected from mainstream and financial press sources, newly-discovered formation dates far

¹²Many of our exchanges might have existed and operated informally prior to incorporation. But in the interest of objectivity and preciseness we begin to follow an exchange after the formal organization is created. Additionally, the incorporation date is often the only available object of interest in the data.

¹³In this context, operational status for an exchange’s online presence is defined as a publicly available (i.e. indexed by a popular search engine) open-access website that is updated regularly to indicate that the exchange continues to trade actively.

¹⁴This bias is similar to the tendency mentioned previously with exchange websites: the history of the survivors is more complete than that of the assimilated or non-operational firms. In a model setting more general than what we will consider, one would need to control for this partially observable mechanism of selection into the dataset.

exceeded closure dates due to the usual selection issue.

Our next approach was to search legal and regulatory documents pertaining to financial exchanges. The information contained in these documents is very detailed and unambiguous, thus serving as an excellent source. Unfortunately, these documents are a relatively recent phenomenon (later half of the 20th century), typically commissioned on an ad hoc basis. As a result, relatively few of these documents are available, limiting their widespread use in the dataset. They are, however, our most reliable source of information on closures. The US Securities and Exchange Commission, for example, has published the “Annual Report of the Securities and Exchange Commission” each fiscal year ending June 30 since 1935. This report contains, among other data, a list of all registered exchanges and exempt exchanges. For other countries, we used similar legal texts to verify the existence or closure of financial exchanges. For example, the UK Securities Contract (Regulation) Act of 1956 and the Stock Transfer Act of 1963 state that only stock exchanges recognized by the Minister for Finance shall be permitted. This allows us to establish that the number of registered exchanges in the United Kingdom and Ireland dropped from 22 in 1964 to 11 in 1965 to 7 in 1966.¹⁵

Having exhausted the availability of regulatory and exchange-specific data, we next look to sources that solely provide evidence of operational status without revealing formation and closure dates. The Moody’s securities manuals, published annually since 1900, list many publicly traded and privately held US companies. Included in a company’s description is often a listing of the exchanges where its shares traded. While originally intended to be a general guide for investors, today Moody’s is probably best known for providing credit ratings for some, but not all, of the securities listed in the manuals. The Moody’s manuals allow us to infer the existence of, and active trading on, exchanges that need not exist today or have been closed in the interim. Specifically, any particular Moody’s manual indicates for each security issued by a company (stock, preferred stock, or bond) the domestic and foreign exchanges on which the security is traded for most, but not all, companies included in the manual. However, the usefulness of this information is limited because the manuals can only provide dates over which a particular exchange was operating; formation and closure dates are not explicitly provided for each exchange. Nevertheless, we utilize the Moody’s data to put bounds on the set of feasible years for an exchange’s formation and closure.

The Moody’s 1903 manual, for example, states that Chatham Bank was traded on the Savannah (Ga.) Cotton Exchange, that Chrystal Consolidated was traded on the Oregon Mining Exchange, and that Orange (NJ) Mutual Trust Co. was traded on the Newark (N.J.) Market. The Moody’s manuals also include foreign companies, mainly registered in Canada or the United Kingdom. As an aside, cross listing of securities on

¹⁵Such an event, directly observable in the data and unattributable to slower-moving macroeconomic trends towards consolidation, provides circumstantial evidence for the proposition that securities regulation induces the closure of financial exchanges.

multiple exchanges is not a recent phenomenon. Armour & Co., to cite one example, was quoted in Louisville (Ky.), Omaha (Neb.), Philadelphia (Pa.), and St. Louis (Mo.) in 1932. Similarly, Sony was simultaneously trading on the Osaka and Tokyo stock exchanges in 1961.

The Moody's manuals were parsed by reading through all of the early years (1900, 1901, and 1903) and 1932. In addition, we read through the international sections of the Moody's manuals for the following years: 1925, 1927, 1947, 1955, 1961, and 1966.¹⁶ We created a list of exchanges whose starting date could not be verified from other sources. For each of these exchanges, we listed all currently-traded companies and then tracked them to see whether they were included in prior or subsequent years of the Moody's manuals.

The Moody's 1903 manual, for example, lists three companies traded on the Albany (N.Y.) Market: Consolidated Car Heating Co., Hudson River Telephone Co., and Rathbone Sard & Co. Tracking these companies through subsequent manuals, we verified that trading continued for at least one of them in Albany until 1908. Similarly, Russell & Erwin Manufacturing and Torrington Co. traded on the Hartford Market from 1903 through 1907 and 1910, respectively. Furthermore, Buffalo & Niagara Falls Electric Light & Power Co., Niagara Falls Power Co., and Taylor Signal were trading in Buffalo (NY) in 1903 and this was verified from 1901 to 1907.

If an exchange previously reported as a listing venue for all previously listed stocks and bonds disappears from the manuals, we consider the exchange closed. To illustrate this, consider the case of the Fall River Market in Massachusetts. We know that trading took place at least as early as the beginning of the 20th century since 38 (31) companies were listed in Moody's Industrial Manual 1900 (1903); the listed firms were mostly mills or related manufacturing companies. According to the Moody's manuals from 1929 and 1937, each listed company had its stock transferred and registered at the company's office. Occasionally stock price ranges (high/low) are provided for the year, and often the number of shareholders is recorded (around 100 to 300). The stocks of some companies were reported in Moody's as "quoted in Fall River" in previous years, but by 1940 no companies are listed in Moody's under Fall River Market and we deem the exchange closed.¹⁷

As a source for data on financial exchanges, the Moody's manuals have limitations. First, the criteria for inclusion of a company have undoubtedly changed over time; the coverage of Moody's increased in the first years of the publication of the manuals. Four Oil Co., for example, was trading on the California Stock and Oil Exchange (San Francisco, Calif.), according to Moody's Industrial Manual 1903, but the company is not

¹⁶The selected years may seem arbitrary, but they were chosen to initially look through Moody's manuals that are in the best readable paper format. For some years, the manuals are in such poor condition that reading is difficult without using the microfiche version.

¹⁷Fall River Market is not mentioned in the SEC manuals as an exchange starting in 1935 because the definition of an exchange applied by Moody's differs from that of the SEC. Alternatively, the Moody's manuals might not have been completely updated each year; if true, our exchange lifetime estimates would be biased upwards. We have no direct evidence to support or disprove this claim.

listed in 1901 or 1913. Second, the manuals are probably geographically biased towards exchanges on the East Coast of the United States. They fail, for example, to report many of the local Western mining exchanges mentioned in Sears (1969, 1973). We do not claim that the Moody’s manuals constitute a comprehensive list of financial exchanges; we view inclusion in the manuals as indirect evidence of the existence of an exchange.

Clearly, the dataset is incomplete: some formation dates and especially closure dates are missing. Moreover, it is possible that some financial exchanges have been excluded completely. Despite these limitations, we have no reason to believe that our collection methodology has imparted any systematic bias to the dataset. The current sample consists of 638 exchanges, approximately half of which (331) are in the United States. Table 1 summarizes the available data on formation and closure dates for our sample of exchanges, partitioned by country. Note that, consistent with asymmetric media coverage of exchange formation and closure, the United States subsample includes substantially more formation events (81%) than closures (30%); this bias is reversed for some countries in the sample (Germany, Italy, Japan, the Netherlands, Spain, Switzerland, and the United Kingdom).

The financial exchange data are supplemented with information on the timing of significant historical events as well as country-specific business cycle data for the United States and United Kingdom (real GDP growth). This historical data includes major advances in communications, regulatory events, country-specific output growth, and periods of elevated uncertainty during commodity rushes and the Internet boom. See Table 2 for a full list of historical events and their respective dating used in the paper. Data on the timing of the US business cycle (that is, recession dates) were obtained from the National Bureau of Economic Research (NBER) for the period 1855 through 2010. We constructed a recession dummy variable for the United Kingdom based on annual GDP growth rates (1855 through 2010) and for our purposes, the United Kingdom is defined as “in recession” if annualized output growth is near-zero or negative. As mentioned previously, we are confident that structural expansion due to industrialization spurred exchange formation. The post-Industrial Revolution era coincides with the formation of over 95% of exchanges in our sample. Despite these points, the Industrial Revolution occurs too early relative to the vast majority of recorded exchange formations to be able to empirically test our conjecture; therefore, the Industrial Revolution is dropped completely from the model as an explanatory variable.¹⁸

To identify historical periods with high uncertainty, we define dummy variables for the Gold Rush and the Internet boom in the United States. Gold rushes occurred at different times across our sample countries: Australia (1851 through 1861), Canada (1869 through 1910), and the United States (California, 1848 through 1874; Comstock Lode, 1896 through 1911). We construct a general “commodity rush” dummy variable for

¹⁸The specific industrial take-off dates for a selection of countries in the sample are as follows: United Kingdom (1780); Belgium, France, Germany, and the United States (1850); Japan, Norway, and Sweden (1875); Canada (1900).

the period of 1855 to 1920, as an approximation to an intricate system of overlapping dummy variables and to account for various other rushes in commodities like petroleum and silver.¹⁹ Finally, the Internet boom is defined as the 1995 to 2010 period and is captured by another dummy variable (termed *Internet*).²⁰

A number of discontinuous events have advanced and shaped the evolution of communications technology as it pertains to financial markets: the invention of the telegraph in 1837, the ticker tape in 1867, the telephone in 1876, the trans-Atlantic cable connecting Europe and the United States in 1886, the personal computer in 1974, and the commercialization of the Internet in 1995.²¹ We consider two possible communications variables: the first is a dummy variable equal to one when the telephone was the state-of-the-art communications technology (1876 through 1976), and the second is an analogous dummy variable for the personal computer pre-Internet (1977 through 1994). While these events define the cutting-edge communications technology, their impact may only be felt broadly when the technology is actually adopted by market participants and households in general.²² Our communications variables do not account for cross-country differences in adoption rates. But most of the countries in the sample are developed economies, so such differences should be minimal.

Finally, our country-specific regulation variables mark periods when financial exchanges were directly monitored by a new governmental authority to prevent securities fraud and abuse. Specifically, these periods are after the Securities Exchange Act of 1934 for the United States (1934 through 2010) and after the Stock Transfer Act of 1963 for the United Kingdom (1965 through 2010)

5 Results

To gain a sense of the data, we provide some summary measures. Figure 1 reports the total number of financial exchanges, while Figure 2 reports cumulative births and closures in each year, 1850 through 2010, aggregated for all 19 sample countries. In Figure 1, we observe an extended upward trend in the number of exchanges through the second half of the 19th century, followed by 110 years of little change. Apart from the long-term trend, the diagram shows periods with relatively violent fluctuations in the number of exchanges.

¹⁹Because our models of exchange formation and closure start with 1855 – the first year all data is available (specifically, US/UK output growth) – the commodity rush dummy variable also starts in 1855. If this restriction were not in place, the commodity rush dummy variable would cover 1848 through 1920 to correspond with the California Gold Rush. We are aggregating many commodity rushes (of varying intensities) in many countries at different times and thus we have to approximate at times. To justify our choice of 1855 as a starting point for the empirical analysis, note that the vast majority of activity in the dataset occurs after 1855.

²⁰The justification here is that the Internet has been available as an open commercial medium since roughly 1995. A richer empirical model would use Internet adoption and broadband penetration rates as a proxy for exchange trading costs, but we are limited by cross-country data incompleteness.

²¹Greenwood and Jovanovic (1999) argue that the technological innovation associated with the IT Revolution of the 1990s favored smaller firms that had recently entered the market. Generalizing this story for all of the communications advances we mention, new entrant exchanges without reputational capital are needed to price risky entrant firms that do business based on the new technology.

²²The relevant usage data are too incomplete to account for technological diffusion in communications over the sample period (especially across countries).

If consolidation towards a limited number of exchanges is indeed occurring, this convergence did not begin on a global level until after the 1930s. Figure 2 reveals a similar long-run accumulation of births and closures, suggesting a fairly steady net number of operating exchanges.

Figures 3 through 6 plot the number of confirmed financial exchange births, deaths, mergers, and closures, respectively, in all 19 sample countries from 1850 through 2010. Looking at the number of exchange births from 1850 to the present, we see distinct periods of exchange formation and periods of consolidation around the long-run trend, particularly from 1865 through 1905 (for formation). For Canada and the United States, many of these exchanges are mining exchanges formed during the late 19th century, though smaller clusters of new exchanges emerge during the stock market rallies of the 1920s and 1990s. Many of the newly formed exchanges from the 1920s disappeared following the stock market crash of 1929. This pattern is consistent among virtually all of our sample countries. Despite having fewer confirmed death dates, Figures 4 and 6 suggest distinct periods of closure. Mergers follow a similar pattern in Figure 5; consistent with advances in communications technology, they are much more prevalent since the 1980s.

Figures 7, 8, 9, and 10 provide similar summary measures for the number of exchanges, births, and closures for two of our sample countries, the United States and the United Kingdom, respectively. In the US data (Figure 7), an increase in the number of exchanges during the Industrial Revolution and the California Gold Rush was followed by a rapid decline after the 1929 crash, subsequent Great Depression of 1929 to 1939, and the introduction of the 1934 Securities Exchange Act. A similar pattern emerges for the United Kingdom (Figure 9) due to bilateral trade with the United States and the synchronization of international business cycles (globalization). There is a much more dramatic increase in closures during the mid-1960s, largely due to the UK Stock Transfer Act of 1963.

5.1 Aggregate Number of Exchanges

Given the incompleteness of the dataset, we execute a number of different data partitions with multiple models. We consider as the dependent variable, the number of financial exchanges, births, and closures separately for the United States, the United Kingdom, and the full sample of 19 countries. We run linear regressions (with robust standard errors) to model the number of financial exchanges on two exchange datasets: restricted and unrestricted. The restricted dataset only includes exchanges when complete information is available (formation date as well as closure date, if the exchange is not currently operating); the unrestricted dataset consists of all exchanges with at least a formation date. Consequently, more exchanges are included in the unrestricted dataset since a large number of exchanges only have formation dates.²³

²³We also run linear regressions with $\log(1 + Exchanges)$ and $\sqrt{Exchanges}$ as a robustness check against the inappropriateness of the linear model due to the nature of *Exchanges* as a nonnegative count outcome. The results are both qualitatively and quantitatively similar to those reported below and are available upon request.

The covariates used as independent variables in the model were discussed in the theory section and, with the exception of output growth, are represented by dummy variables: they are the growth rate in output (lagged one year), periods of elevated uncertainty (rushes), advances in communications technology, and regulation. Additionally, a time trend and squared time trend are included to account for slow-moving structural trends. The growth rate of output ($GDPGL1$, lagged one year) is measured by country-specific historical GDP figures for the United States and United Kingdom over the period 1855 to 2010. *Rush* is an indicator for the gold/silver/petroleum rush period of 1855–1920; *Internet* takes a value of one only over 1995 through 2010 and is equivalent to an indicator for the Internet as the state-of-the-art telecommunications technology. *Telephone* is equal to one from 1876 to 1976 and zero otherwise, and is equivalent to an indicator for the telephone as state-of-the-art. *US Reg* accounts for the 1934–2010 period after the introduction of the 1934 Securities Exchange Act in the United States; *UK Reg* is similar for the United Kingdom’s 1963 Stock Transfer Act. Finally, *Time* is a linear time trend, and $Time^2$ is a quadratic time trend. For a complete list of variables and their definitions see Table 3.

The results for the linear regression analysis of the number of exchanges are shown in Table 4. Separate unrestricted and restricted results are shown for the United States, United Kingdom, and full sample as successive columns across the table. Considering the various sets of variables, it is clear that output growth has little (at the 10% level), if any, impact on the number of exchanges. Specifically, the signs are mixed (US positive and UK negative) and imprecisely estimated. We conjecture that growth periods in the business cycle contain much more noise and occur at a higher frequency than is useful for explaining the slow tide of capital movement, which drives the formation and maturation of exchanges. The statistically significant positive coefficients on the lagged exchange and net exchange formation variables demonstrate the persistence and autocorrelation, in both levels and first differences, of the number of exchanges. This provides further evidence of a slow-moving trend underlying the number of exchanges. The rush variables (*Rush* and *Internet*), delineating periods of high uncertainty, show positive and significant coefficients ranging from 0.5 to 2.3, implying a permanent increase of up to two exchanges per year during such periods. Regulation has the opposite, and slightly more potent, effect with significant negative coefficients ranging from -1.6 to -2.8 for *US Reg* and *UK Reg*. Consequently, increases in regulation are associated with up to a three exchange reduction in the number of exchanges per year. Thus, the results in Table 4 are consistent with many of our hypotheses, such that the rush and regulation variables are of the correct sign and, for the most part, precisely estimated. Considering the resources (time, capital, reputation, etc.) necessary to start up or close an exchange, these results present strong support for our hypotheses that is also economically relevant.

5.2 Exchange Formations

We next model financial exchange formations (exchange births). Given the nature of the data as a nonnegative count outcome (with a large number of zeroes), we estimate Poisson regression models (with robust standard errors) of exchange formation, where the dependent variable is equal to the number of exchange births in a given year for a particular country (United States/United Kingdom) or set of countries (full sample of 19 countries). The covariates included as independent variables are identical to those used in the linear regression analysis of the number of exchanges. Table 5 displays our results. When we focus our analysis on exchange births our results are largely similar to the results for the number of exchanges, though there are some pockets of fortified results particularly for the restricted sample. Specifically, growth in US output is significant in the restricted sample (at the 0.10 level), with increases in output associated with additional exchange births. The rush variables again positively affect exchange births, with substantially larger coefficients in the UK sample. There are also continued strong evidence for the negative effect of regulation (fewer exchange births) particularly in the US sample. In summary, the results in Table 5 reinforce our earlier results on the number of exchanges the direction and nature of the results hold, with slight shifts in the magnitude and precision of the estimated coefficients. One caveat bears mention: these supportive results are not realized in a logit or probit model, or if *NEFL1* (net exchange formation, lagged one period), *EXL1* (number of exchanges, lagged one period), or both are removed from the regression.²⁴

5.3 Exchange Closures

Our models of exchange closure are similar our formation models. We run Poisson models (with robust standard errors) of exchange closure, where the dependent variable is equal to the number of exchange closures in a given year for the United States, United Kingdom, or the full set of countries (full sample). The covariates differ only slightly from those used in the analysis of exchange formation. Specifically, we replace *Rush* with *Telephone* since we expect that *Rush* (*Telephone*) is more closely associated with exchange formation (closure). Table 6 provides the relevant results. In general, the exchange closure results resemble their formation counterparts, despite the fact that we observe far fewer closures relative to formation events. Specifically, growth in output is largely insignificant with mixed signs. Advances in communications, denoted by *Telephone*, increase exchange closures as hypothesized, particularly for the UK sample. Interestingly, *Internet*, which we consider as representing a period of uncertainty (rush variable), displays mixed signs within the US and full sample (imprecisely estimated) and significant positive coefficients for the UK sample.

²⁴We also ran probit, logit, and negative binomial models. These additional results are available upon request. Part of the reason for the difference in the results is that a logit/probit model discards much of the information content of the dependent variable by approximating the exchange formation process as a zero/one event; all else equal, one would expect reduced power for statistical tests (i.e. the t-test).

The internet results suggest that this variable may also be capturing advances in communications technology through the dissemination of information on the World Wide Web, an interpretation that is consistent with the UK results. Finally, as predicted regulation in both the United States and the United Kingdom has a significant positive effect on exchange closures, particularly for the restricted sample.²⁵ We extend our prior results in two important ways. We first investigate the effect that passage of blue sky laws (that is, US state level oversight) has on the regulation results. We then provide a closer look at how the formation of the European Union has affected the evolution of exchanges.

5.4 US State Level Regulation

The previous results showed that regulation has a significant negative (positive) impact on the number of exchanges and births (closures). We provide further support for these results by investigating the passage of blue sky laws within each US state. The name “blue sky” law stems from one of the pioneering legal cases on the issue (Hall v. Geiger-Jones Co., US 539, 1917) in which the judge ruled to prevent “speculative schemes which have no more basis than so many feet of blue sky.” Table 7 reproduces Table 1 from Mahoney (2003) and shows the timing of blue sky law passage by state. We re-estimate the United States analysis in Tables 4, 5, and 6, now including dummy variables by state, which mark periods that the state-level blue sky laws were in effect. Table 8 presents the results based on the unrestricted sample for the number of exchanges, exchange births, and exchange closures in successive (left to right) columns. The blue sky law variable (*Blue Sky*) displays significant (at the 0.10 level) negative and positive coefficients for the exchange count and closure regressions, respectively. The blue sky law variable helps to describe the dependent variable data better as it strengthens the explanatory power of many of the other independent variables, most dramatically for the closure analysis. And the economic impact of the blue sky law variable is substantial as the estimated coefficients are similar in magnitude to the federal regulation variable (*US Reg*). This provides further evidence of the power of regulation to both curtail the number of formations and encourage exchange closure. These results imply that regulation, either state or federal, is an important driver of exchange closure and consolidation.

5.5 Exchanges in the European Union

As with US blue sky laws, the European Union (EU) provides another setting in which to study the evolution of exchanges. The US experience of regulation, first at the state level, and next at the federal level, bears some resemblance to the experience within the European Union with regulation at the member country level followed by regulation at the EU level, most notably the 4th and 7th directives. Nevertheless, there are differences. For one, the European Union left unlinked its members’ fiscal policies. The members also

²⁵We also ran negative binomial models. These additional results are available upon request.

joined the Union at different times, which provides an interesting counterpoint and a time-series aspect to the analysis. The formation of the European Union meant the breakdown of economic and financial barriers and strengthening of economic ties among member countries. Prior to the formation of the European Union, each member country had its own stock exchange(s) within its own regulatory framework. Over time, the European Union added a new layer of regulatory framework and policies. On the one hand, we would expect more consolidation in the common EU regulatory framework due to a new layer of regulation, despite calls by EU officials for greater competition among exchanges. The exchange mergers that resulted in Euronext and NASDAQ OMX lend support for this view. Interestingly, results are decidedly different for the United Kingdom, which is a member of the union but opted out of participating in the common currency, the euro. The United Kingdom has witnessed a number of exchange formations in recent years.

Our results would also suggest that if the recent turmoil in member countries (Greece, Portugal, Italy, Ireland, etc.) continues, and causes an increased uncertainty about the viability of the European Union, then we may see a reversal of the recent trend of consolidation and possibly even some exchange formations. Consistent with this conjecture, we note that currently within the European Union, exchange mergers are much more prevalent than closures, as a consolidation strategy. This strategy leaves open the option of an exchange being able to break up if the European Union itself begins to unravel.

6 Conclusion

The historical record is not consistent with the theory that only one financial exchange should exist in each country, or the world as an integrated economic entity. We document periods of expansion and contraction in many of the 19 countries that we investigate. Periods of formation are weakly associated with economic expansion, as measured by output growth, and above-trend uncertainty and speculation. Periods of contraction coincide with heightened regulation, technological or communications advances, and negative political shocks (wars, revolutions, coups, and so on). This suggests that the heralded consolidation of exchanges may only be a transitory phenomenon. We predict that, as long as some demand for liquidity provision services (e.g., venture capital) goes unmet by existing exchanges, new exchanges will form to meet that demand.²⁶ Advances in technology may render consolidation more attractive. But, we predict that advances will not eliminate the role for competing (entrant) exchanges to resolve uncertainty about the viability of risky claims. This suggests that the economic role for competition among exchanges is not yet fully understood by the existing literature and could be explored further in future work.

²⁶In this sense, “demand creates its own supply” in the market for liquidity.

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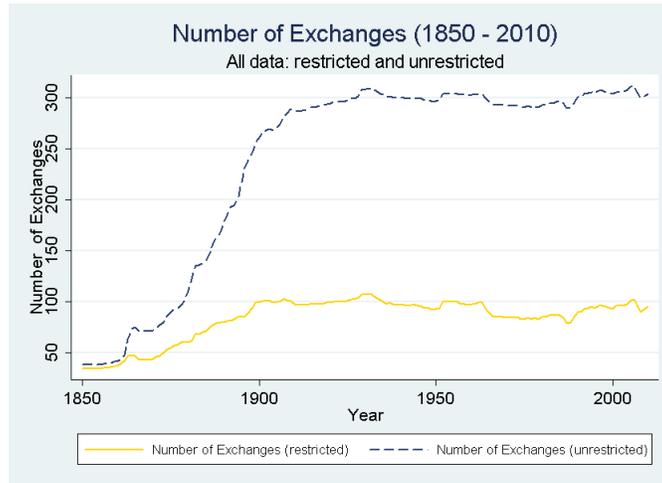
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7 Figures

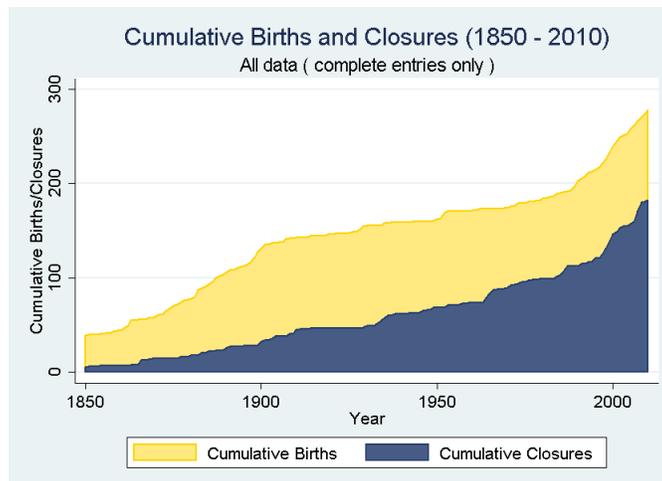
7.1 All Countries

Figure 1: All Countries, Number of Exchanges, 1850–2010



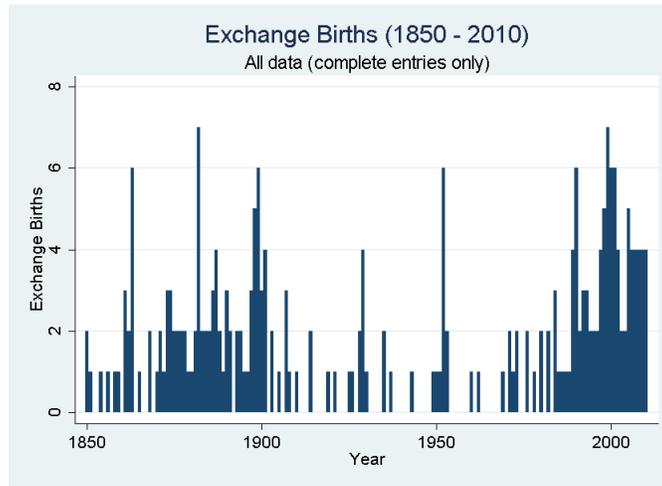
Notes: The phrase “all countries” refers to the complete sample, as detailed in Section A.1 “List of Exchanges by Country” in the Appendix. Unrestricted: only exchanges that have a formation date are included in the sample for analysis. Restricted: only exchanges that have both a formation date and a closure date (or have survived to the end of the sample period, 2010) are included in the sample.

Figure 2: All Countries, Exchange Births and Closures (Cumulative), 1850–2010



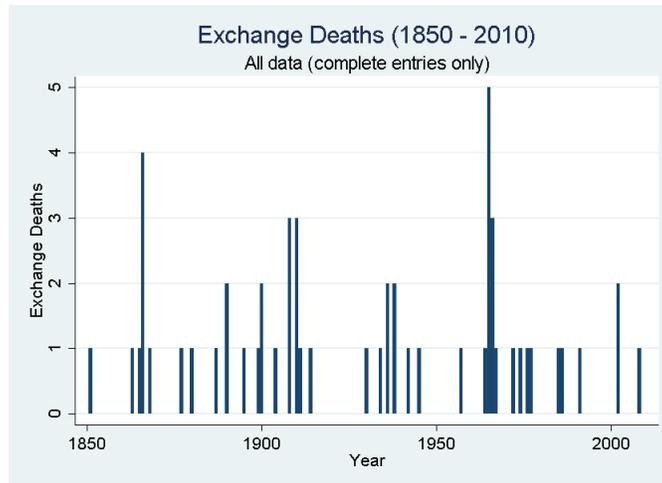
Notes: The phrase “all countries” refers to the complete sample, as detailed in Section A.1 “List of Exchanges by Country” in the Appendix. The phrase “complete entries only” refers to the restricted sample. Restricted: only exchanges that have both a formation date and a closure date (or have survived to the end of the sample period, 2010) are included in the sample. The variable “closures” is defined as the sum of exchange deaths and mergers year-by-year. The term “exchange death” is defined as the permanent shutdown of an exchange due to prevailing market conditions, not a merger or buyout; the exchange halts trading and its assets are liquidated.

Figure 3: All Countries, Exchange Births, 1850–2010



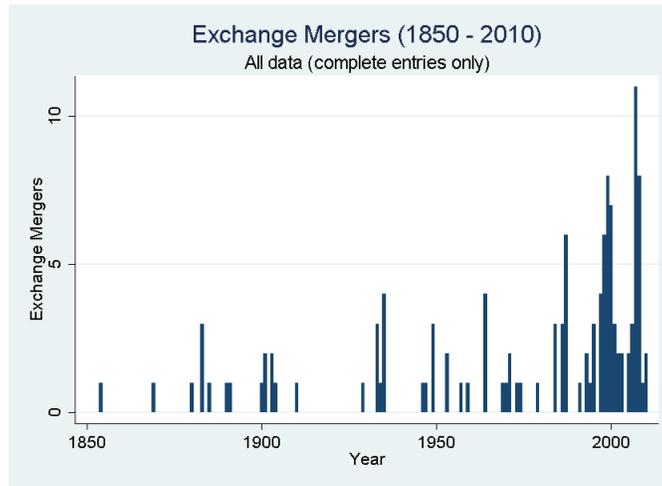
Notes: The phrase “all countries” refers to the complete sample, as detailed in Section A.1 “List of Exchanges by Country” in the Appendix.

Figure 4: All Countries, Exchange Deaths, 1850–2010



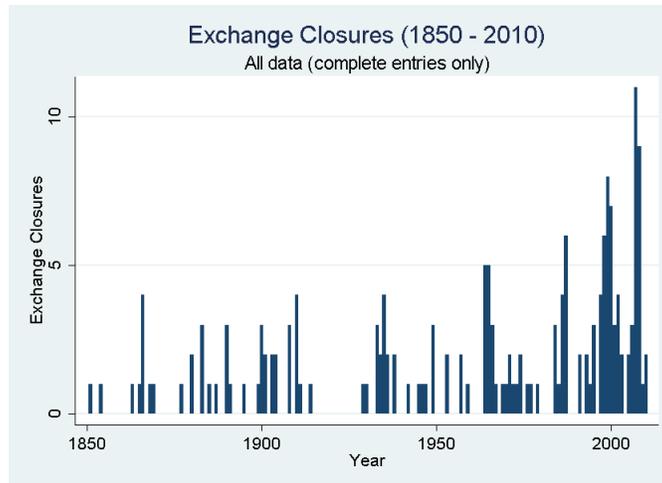
Notes: The phrase “all countries” refers to the complete sample, as detailed in Section A.1 “List of Exchanges by Country” in the Appendix. The term “exchange death” is defined as the permanent shutdown of an exchange due to prevailing market conditions, not a merger or buyout; the exchange halts trading and its assets are liquidated.

Figure 5: All Countries, Exchange Mergers, 1850–2010



Notes: The phrase “all countries” refers to the complete sample, as detailed in Section A.1 “List of Exchanges by Country” in the Appendix.

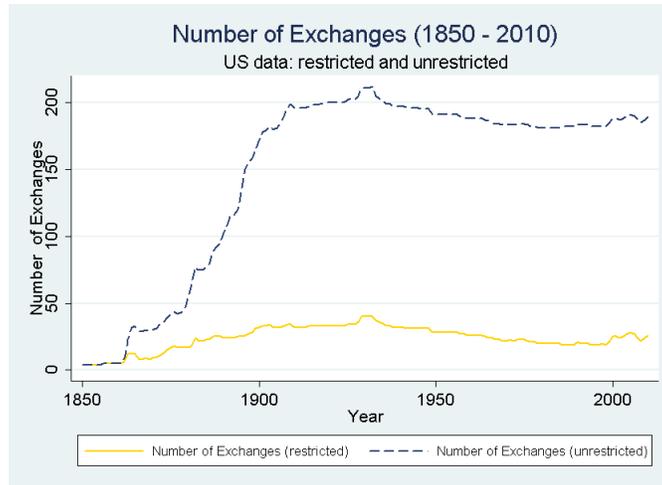
Figure 6: All Countries, Exchange Closures, 1850–2010



Notes: The phrase “all countries” refers to the complete sample, as detailed in Section A.1 “List of Exchanges by Country” in the Appendix. The variable “exchange closures” is defined as the sum of exchange deaths and mergers year-by-year. The term “exchange death” is defined as the permanent shutdown of an exchange due to prevailing market conditions, not a merger or buyout; the exchange halts trading and its assets are liquidated.

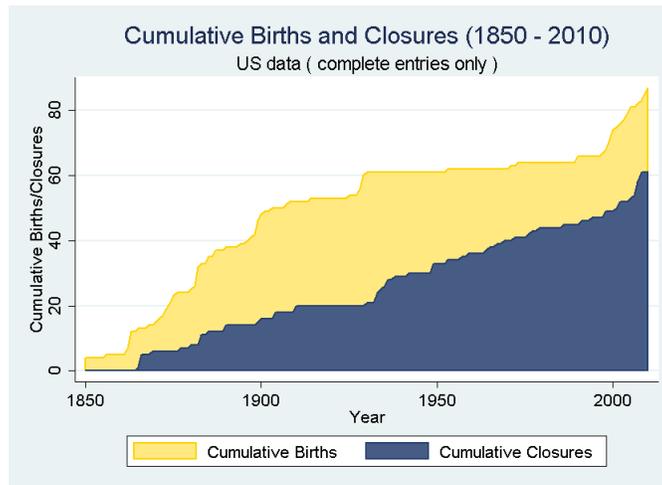
7.2 United States

Figure 7: US, Number of Exchanges, 1850–2010



Notes: *Unrestricted: only exchanges that have a formation date are included in the sample for analysis. Restricted: only exchanges that have both a formation date and a closure date (or have survived to the end of the sample period, 2010) are included in the sample.*

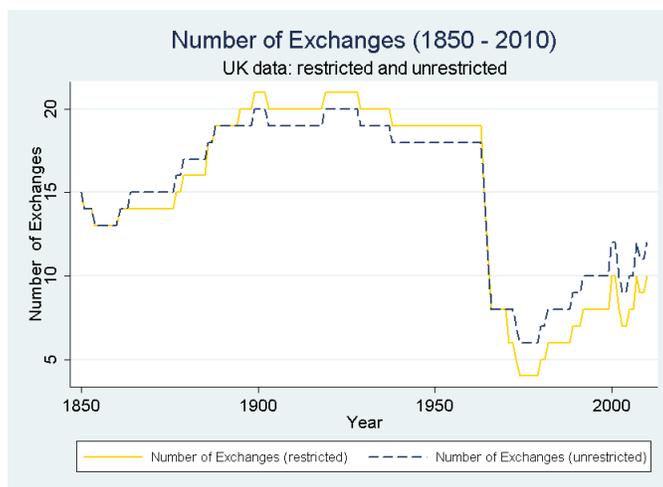
Figure 8: US, Exchange Births and Closures (Cumulative), 1850–2010



Notes: *The phrase “complete entries only” refers to the restricted sample. Restricted: only exchanges that have both a formation date and a closure date (or have survived to the end of the sample period, 2010) are included in the sample. The variable “closures” is defined as the sum of exchange deaths and mergers year-by-year. The term “exchange death” is defined as the permanent shutdown of an exchange due to prevailing market conditions, not a merger or buyout; the exchange halts trading and its assets are liquidated.*

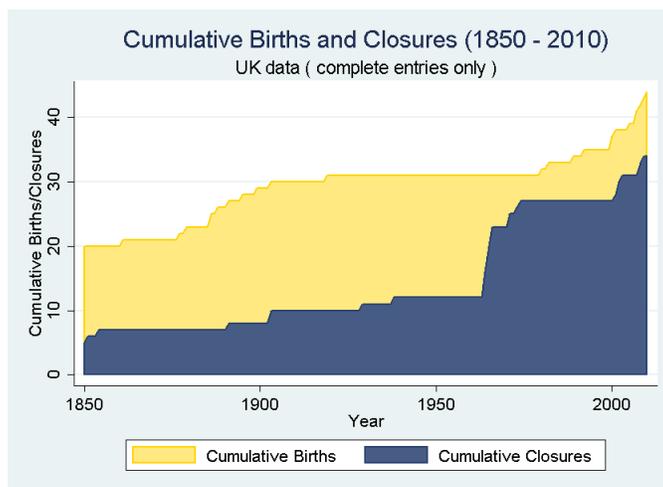
7.3 United Kingdom (England, Northern Ireland, and Scotland)

Figure 9: UK, Number of Exchanges, 1850–2010



Notes: *Unrestricted*: only exchanges that have a formation date are included in the sample for analysis. *Restricted*: only exchanges that have both a formation date and a closure date (or have survived to the end of the sample period, 2010) are included in the sample.

Figure 10: UK, Exchange Births and Closures (Cumulative), 1850–2010



Notes: The phrase “complete entries only” refers to the restricted sample. *Restricted*: only exchanges that have both a formation date and a closure date (or have survived to the end of the sample period, 2010) are included in the sample. The variable “closures” is defined as the sum of exchange deaths and mergers year-by-year. The term “exchange death” is defined as the permanent shutdown of an exchange due to prevailing market conditions, not a merger or buyout; the exchange halts trading and its assets are liquidated.

8 Results (Tables)

8.1 Summary

Table 1: Data Completeness, Exchange Formation and Closure Dates by Country

Country	Number of Exchanges	Percentage Complete	
		Formation (%)	Closure (%)
Australia	29	83	69
Belgium	6	100	100
Canada	44	84	57
Chile	3	100	100
China	15	100	100
France	14	43	43
Germany	23	69	74
Ireland	8	87	62
Italy	13	31	100
Japan	43	60	88
The Netherlands	5	80	100
Norway	16	100	31
Singapore	4	100	100
Spain	7	86	100
Sweden	9	67	67
Switzerland	7	71	86
Taiwan	2	100	100
United Kingdom	59	73	81
United States	331	81	30
Total	638	78	52

Notes: The variable “closures” is defined as the sum of exchange deaths and mergers year-by-year. The term “exchange death” is defined as the permanent shutdown of an exchange due to prevailing market conditions, not a merger or buyout; the exchange halts trading and its assets are liquidated. China: defined here as the People’s Republic of China plus the Hong Kong SAR (Special Administrative Region). Taiwan: defined as the Republic of China.

8.2 Timing of Historical Events

Table 2: Data on the Timing of Historical Events

Event	Date(s)	Rationale
California Gold Rush	1848	Gold discovered at Sutter’s Mill (Coloma, California).
Texas Oil Rush	1900	Oil strike at Spindletop Hill, Texas in 1901.
Commodity rush (duration) [†]	1855–1920	Combines various country-specific gold rushes with oil rushes.
Telegraph (introduction)	1845	First commercial telegraph line in the US.
Telephone (introduction)	1876	Alexander Graham Bell awarded patent for electric telephone.
Airmail (introduction)	1918	US Post Office launches first regular airmail service.
Television (introduction)	1928	Acceleration of television patent activity, leading to adoption.
Fax machine (introduction)	1975	First commercial (telephone) fax machine introduced.
Personal computer (introduction)	1977	Apple II, PET, and TRS-80 personal computers introduced.
Internet (introduction)	1995	Commercial restrictions on the use of the Internet lifted.
Telephone (state-of-the-art) [†]	1876–1976	Introduced in 1876; replaced by the personal computer.
Personal computer (state-of-the-art)	1977–1994	Introduced in 1977; replaced by the Internet.
Internet (state-of-the-art) [†]	1995–2010	Introduced in 1995; current state-of-the-art technology.
UK financial regulation (duration) [†]	1965–2010	Introduction of the Stock Transfer Act of 1963 in the UK.
US financial regulation (duration) [†]	1934–2010	Introduction of the 1934 Securities Exchange Act in the US.

Notes: The term “duration” refers to the set of dates for which the event in question was active or ongoing. The term “introduction” refers to the technological development and large-scale introduction of the communications innovation in question into mainstream (non-academic) US/UK society for business use. The term “state-of-the-art” is used to denote the period of a particular communications technology’s dominance over all other forms of high-speed mass communication in industrialized societies (e.g. the US and Europe). A dagger (†) denotes a variable that is used in our empirical work (see Section 8.3 “Results”).

8.3 Results

Table 3: Variable Definitions

Variable	Definition
$Births_t$	Number of exchange formation events in a country.
$Closures_t$	Sum of exchange mergers and exchange deaths in a country.
$Exchanges_t$	Number of exchanges actively operating in a country.
$GDPGL1_t$	GDP (Gross Domestic Product) growth (percentage points) in a country, lagged one year.
$NEFL1_t$	Net exchange formation in a country, lagged one year ($NEFL1_t = NEF_{t-1} = Births_{t-1} - Closures_{t-1}$).
$EXL1_t$	$Exchanges_t$ lagged one year ($EXL1_t = Exchanges_{t-1}$).
$Blue\ Sky_{st}$	Indicator function; $Blue\ Sky_{st} = 1$ if US state s has a Blue Sky law in effect in year t , 0 otherwise.
$Rush_t$	Indicator function; $Rush_t = 1$ if year $t \in [1855, 1920]$, 0 otherwise (gold and petroleum commodity rushes).
$Telephone_t$	Indicator function; $Telephone_t = 1$ if year $t \in [1876, 1976]$, 0 otherwise (telephone as state-of-the-art).
$Internet_t$	Indicator function; $Internet_t = 1$ if year $t \in [1995, 2010]$, 0 otherwise (Internet as state-of-the-art).
$US\ Reg_t$	Indicator function; $US\ Reg_t = 1$ if year $t \in [1934, 2010]$, 0 otherwise (1934 Securities Exchange Act).
$UK\ Reg_t$	Indicator function; $UK\ Reg_t = 1$ if year $t \in [1965, 2010]$, 0 otherwise (1963 Stock Transfer Act).

Notes: The term “exchange death” is defined as the permanent shutdown of an exchange due to prevailing market conditions, not a merger or buyout; the exchange halts trading and its assets are liquidated. Time subscript t stands for year. All variables listed here are available from 1855–2010 on an annual basis, i.e. $t \in [1855, 2010]$; the sample period was chosen to avoid data incompleteness. Suppress state/time subscripts on all variables from this point forward.

Table 4: Linear Regression Analysis of the Number of Exchanges (1855–2010)

Dependent Variable: <i>Exchanges</i>												
	United States			United Kingdom			All Countries					
	Unrestricted	Restricted		Unrestricted	Restricted		Unrestricted	Restricted				
<i>GDPGL1_{US}</i>	−0.016 (0.061)	0.032 (0.021)					0.081 (0.062)	0.050 (0.030)				
<i>GDPGL1_{UK}</i>				−0.026 (0.013)	* (0.014)	−0.027 (0.014)	* (0.083)	−0.021 (0.083)	−0.053 (0.046)			
<i>NEFL1</i>	0.443 (0.129)	*** (0.103)	0.140	0.307 (0.115)	***	0.252 (0.105)	**	0.467 (0.090)	***	0.268 (0.100)	***	
<i>EXL1</i>	0.954 (0.015)	***	0.866 (0.039)	***	0.800 (0.063)	***	0.827 (0.049)	***	0.956 (0.013)	***	0.883 (0.035)	***
<i>Rush</i>	2.049 (0.967)	**	−0.100 (0.431)		0.509 (0.204)	**	0.510 (0.211)	**	2.255 (0.961)	**	1.263 (0.601)	**
<i>Internet</i>	2.139 (0.802)	***	1.996 (0.718)	***	0.823 (0.441)	*	0.823 (0.454)	*	0.845 (1.233)		0.902 (1.187)	
<i>US Reg</i>	−1.640 (1.067)		−1.620 (0.497)	***				−2.806 (1.031)	***	−2.681 (0.789)	***	
<i>UK Reg</i>				−2.075 (0.750)	***	−2.203 (0.787)	***	−0.888 (0.961)		−2.186 (1.084)	**	
Also included: <i>Time</i> , <i>Time</i> ² , constant												
<i>R</i> ²	0.998	0.979		0.984		0.987		0.999		0.991		
Root MSE	2.590	1.177		0.569		0.639		2.748		1.862		
Sample size: 156												

Notes: In all six regressions listed above, the dependent variable is *Exchanges* (cumulative births minus cumulative closures). Robust standard errors are reported in parentheses. Significance levels: 0.10 (*), 0.05 (**), 0.01 (***). Unrestricted: only exchanges that have a formation date are included in the sample for analysis. Restricted: only exchanges that have both a formation date and a closure date (or have survived to the end of the sample period, 2010) are included in the sample. The variable *Closures* is defined as the sum of exchange deaths and mergers year-by-year. The term “exchange death” is defined as the permanent shutdown of an exchange due to prevailing market conditions, not a merger or buyout; the exchange halts trading and its assets are liquidated. The phrase “all countries” refers to the complete sample, as detailed in Section A.1 “List of Exchanges by Country” in the Appendix. See data section of the paper for variable definitions. Variables *Time* and *Time*² are linear and quadratic time trends, respectively.

Table 5: Poisson Regression Analysis of Exchange Formation (1855–2010)

	Dependent Variable: <i>Births</i>									
	United States			United Kingdom			All Countries			
	Unrestricted		Restricted	Unrestricted		Restricted	Unrestricted		Restricted	
<i>GDPGL1_{US}</i>	-0.025		0.085	**			0.036		0.059	***
	(0.022)		(0.038)				(0.024)		(0.021)	
<i>GDPGL1_{UK}</i>					0.018	-0.008	0.020		0.017	
					(0.064)	(0.070)	(0.030)		(0.026)	
<i>NEFL1</i>	0.135	***	0.227	***	0.168	0.158	0.100	***	0.116	***
	(0.019)		(0.068)		(0.203)	(0.191)	(0.014)		(0.034)	
<i>EXL1</i>	-0.022	***	-0.088	**	-0.229	-0.218	-0.011	**	-0.019	
	(0.006)		(0.037)		(0.235)	(0.218)	(0.004)		(0.018)	
<i>Rush</i>	1.230	**	0.178		4.914	***	18.414	***	1.167	***
	(0.478)		(0.607)		(1.360)		(1.362)		(0.439)	
<i>Internet</i>	1.753		1.583	*	-0.677	-0.049	0.696	*	0.606	*
	(0.867)		(0.902)		(1.096)	(1.119)	(0.358)		(0.366)	
<i>US Reg</i>	-3.796	***	-4.585	***			-1.829	***	-1.281	*
	(0.975)		(1.574)				(0.578)		(0.674)	
<i>UK Reg</i>					-4.066	9.916	***	-0.025	-0.187	
					(3.441)	(3.433)		(0.490)	(0.709)	
Also included: <i>Time</i> , <i>Time</i> ² , constant										
Pseudo- <i>R</i> ²	0.435		0.249		0.181	0.202	0.324		0.196	
Wald χ^2	164.33		52.95		45.63	3473.69	223.69		128.20	
Pearson χ^2	282.41		175.20		108.57	103.45	301.54		198.23	
Sample size: 156										

Notes: In all six regressions listed above, the dependent variable is *Births*. Robust standard errors are reported in parentheses. Significance levels: 0.10 (*), 0.05 (**), 0.01 (***). Unrestricted: only exchanges that have a formation date are included in the sample for analysis. Restricted: only exchanges that have both a formation date and a closure date (or have survived to the end of the sample period, 2010) are included in the sample. The variable *Closures* is defined as the sum of exchange deaths and mergers year-by-year. The term “exchange death” is defined as the permanent shutdown of an exchange due to prevailing market conditions, not a merger or buyout; the exchange halts trading and its assets are liquidated. The phrase “all countries” refers to the complete sample, as detailed in Section A.1 “List of Exchanges by Country” in the Appendix. See data section of the paper for variable definitions. Variables *Time* and *Time*² are linear and quadratic time trends, respectively.

Table 6: Poisson Regression Analysis of Exchange Closure (1855–2010)

	Dependent Variable: <i>Closures</i>										
	United States		United Kingdom				All Countries				
	Unrestricted	Restricted	Unrestricted	Restricted	Unrestricted	Restricted	Unrestricted	Restricted			
$GDPGL1_{US}$	-0.048 (0.034)	-0.000 (0.032)					0.005 (0.028)	-0.002 (0.028)			
$GDPGL1_{UK}$			0.148 (0.097)	0.127 (0.090)	0.091 (0.042)	**	0.085 (0.043)	*			
$NEFL1$	0.045 (0.057)	0.076 (0.113)	-0.227 (0.249)	0.038 (0.200)	0.007 (0.031)		-0.043 (0.039)				
$EXL1$	0.011 (0.010)	0.218 (0.062)	***	0.454 (0.121)	***	0.396 (0.091)	***	0.020 (0.008)	**	0.094 (0.017)	***
<i>Telephone</i>	1.028 (0.769)	0.466 (0.881)	19.515 (1.285)	***	18.428 (1.491)	***	0.661 (0.468)	0.142 (0.509)			
<i>Internet</i>	0.632 (0.672)	-2.177 (1.409)	13.572 (1.412)	***	11.946 (1.634)	***	0.563 (0.589)	-0.143 (0.596)			
<i>US Reg</i>	1.154 (1.188)	2.006 (0.593)	***		1.066 (0.672)		2.009 (0.582)	***			
<i>UK Reg</i>			2.669 (1.715)	3.749 (1.707)	**	1.130 (0.708)	2.056 (0.726)	***			
Also included: <i>Time</i> , <i>Time</i> ² , constant											
Pseudo- R^2	0.049	0.131	0.416	0.407	0.231	0.263					
Wald χ^2	13.76	41.31	n/a	1770.78	72.61	104.22					
Pearson χ^2	321.67	188.30	128.88	128.69	273.39	256.97					
Sample size: 156											

Notes: In all six regressions listed above, the dependent variable is *Closures*. Robust standard errors are reported in parentheses. Significance levels: 0.10 (*), 0.05 (**), 0.01 (***). Unrestricted: only exchanges that have a formation date are included in the sample for analysis. Restricted: only exchanges that have both a formation date and a closure date (or have survived to the end of the sample period, 2010) are included in the sample. The variable *Closures* is defined as the sum of exchange deaths and mergers year-by-year. The term “exchange death” is defined as the permanent shutdown of an exchange due to prevailing market conditions, not a merger or buyout; the exchange halts trading and its assets are liquidated. The phrase “all countries” refers to the complete sample, as detailed in Section A.1 “List of Exchanges by Country” in the Appendix. See data section of the paper for variable definitions. Variables *Time* and *Time*² are linear and quadratic time trends, respectively.

Table 7: Dates of Adoption of Blue Sky Laws

Year	Merit Review	Ex-Ante Fraud	Ex-Post Fraud
1911	Kansas		
1912	Arizona		Louisiana
1913	Arkansas, Idaho, Michigan, Montana, North Dakota, South Dakota, Tennessee, Vermont, West Virginia	California, Florida, Georgia, Iowa, Missouri, Nebraska, North Carolina, Texas, Wisconsin	Maine, Oregon
1915		South Carolina	
1916		Mississippi, Virginia	
1917		Minnesota	New Hampshire
1919		Alabama, Illinois, Oklahoma, Utah, Wyoming	
1920		Indiana, Kentucky	Maryland, New Jersey
1921		Massachusetts, New Mexico, Rhode Island	New York
1923		Colorado, Washington	Pennsylvania
1929			Connecticut
1931			Delaware

Reproduced from Mahoney (2003), Table 1.

Table 8: Regression Analysis of US Exchanges by State (1855–2010)

Dependent Variable: <i>Exchanges</i>		Dependent Variable: <i>Births</i>		Dependent Variable: <i>Closures</i>	
<i>GDPGL1</i>	0.006 (0.004)	0.054 (0.031)	*	−0.032 (0.042)	
<i>NEFL1</i>	0.221 * (0.112)	0.369 *** (0.053)		0.161 * (0.090)	
<i>EXL1</i>	0.978 *** (0.006)	−0.063 ** (0.026)		0.435 *** (0.049)	
<i>Blue Sky</i>	−0.097 ** (0.034)	−0.684 (0.641)		0.948 ** (0.457)	
<i>Rush</i>	0.063 (0.042)	0.412 (0.633)			
<i>Telephone</i>				1.536 ** (0.693)	
<i>Internet</i>	0.070 *** (0.022)	3.037 * (1.551)		−0.130 (0.624)	
<i>US Reg</i>	−0.111 ** (0.040)	−2.444 *** (0.684)		2.129 * (1.094)	
Also included: <i>Time</i> , <i>Time</i> ² , constant					
<i>R</i> ² (Overall)	0.996	Wald χ^2	13847.20	Wald χ^2	6.21×10^6
Observations	2002		2002		1540
Groups	13		13		10

Notes: In the three regressions listed above, the dependent variable is *Exchanges* (cumulative births minus cumulative closures), *Births*, and *Closures* by US state, respectively. Robust standard errors are reported in parentheses, clustered at the state level for 13 US states with 5 or more exchanges at the end of the sample: California, Colorado, Illinois, Massachusetts, Minnesota, Missouri, Nevada, New York, Ohio, Oregon, Pennsylvania, Texas, and Utah. Nevada is counted as never passing a blue sky law. State-level fixed effects are included. Significance levels: 0.10 (*), 0.05 (**), 0.01 (***). Data used are unrestricted: only exchanges that have a formation date are included in the sample for analysis. The variable *Closures* is defined as the sum of exchange deaths and mergers year-by-year. The term “exchange death” is defined as the permanent shutdown of an exchange due to prevailing market conditions, not a merger or buyout; the exchange halts trading and its assets are liquidated. See data section of the paper for variable definitions; variables *NEFL1*, *EXL1*, and *Blue Sky* are now defined at the state level. Variables *Time* and *Time*² are linear and quadratic time trends, respectively.

A Appendix

A.1 List of Exchanges by Country

A.1.1 Australia

Table 9: Australia, List of Exchanges

Exchange Name	Start	End	Merger	Merger Partner
Adelaide Stock Exchange	1883		1987	Australian Stock Exchange
Asia Pacific Exchange	1997	current		
Australasian Mining Exchange	1888			
Australian Derivatives Exchange [†]	2001	2001		
Australian Stock Exchange	1900	current		
Ballarat Stock Exchange	1858	1914		
Bendigo Stock Exchange	1859		2005	Newcastle Stock Exchange
Brisbane Stock Exchange	1884		1987	Australian Stock Exchange
Charter Towers Stock Exchange	1901	1910		
Financial and Energy Exchange	2006	current		
Gympie Stock Exchange	1901	1910		
Hobart Stock Exchange	1882		1987	Australian Stock Exchange
Kalguri Stock Exchange				
Launceston Stock Exchange	1881		1970	Hobart Stock Exchange
Melbourne Stock Exchange	1861		1987	Australian Stock Exchange
NSW Mining and Stock Exchange [†]	1887	1887		
Newcastle Stock Exchange	1937	current		
Open Stock and Share Exchange	1880			
Perth Stock Exchange	1888		1890	Stock Exchange of Perth
Queenstown Stock Exchange				
Rockhampton Stock Exchange				
Stock Exchange of New South Wales	1890	1895		
Stock Exchange of Perth	1889		1987	Australian Stock Exchange
Sydney Open Call Stock Exchange	1890			
Sydney Stock Exchange	1871		1987	Australian Stock Exchange
Sydney Futures Exchange	1960		2006	Australian Stock Exchange
The Stock Exchange of Melbourne	1865			
Townsville Stock Exchange				
Zeehan				

Notes: The entry “current” denotes a surviving exchange that continues to operate independently as of the date of this publication. A dagger (†) denotes a “short-lived” exchange with an estimated lifetime of three years or less. Alternate exchange names: Asia Pacific Exchange (Australia Pacific Exchange), Australian Stock Exchange (Australian Securities Exchange), Newcastle Stock Exchange (National Stock Exchange of Australia), Sydney Stock Exchange (Royal Exchange), Sydney Futures Exchange (Sydney Greasy Wool Futures Exchange), The Stock Exchange of Melbourne (Melbourne Stock Exchange).

A.1.2 Belgium

Table 10: Belgium, List of Exchanges

Exchange Name	Start	End	Merger	Merger Partner
Antwerp Stock Exchange	1700		1998	Brussels Stock Exchange
Belgian Futures and Options Exchange	1991		1999	Brussels Stock Exchange
Belpex	2005		2010	Amsterdam Power Exchange
Brussels Stock Exchange	1600		2000	Euronext
Easdaq	1996		2001	NASDAQ OMX
Nasdaq Europe [†]	2001	2003		

Notes: A dagger (†) denotes a “short-lived” exchange with an estimated lifetime of three years or less. Alternate exchange names: Belgian Futures and Options Exchange (BELFOX), Brussels Stock Exchange (Brussels Exchanges).

A.1.3 Canada

Table 11: Canada, List of Exchanges (1)

Exchange Name	Start	End	Merger	Merger Partner
Alberta Stock Exchange	1914		1999	Canadian Venture Exchange
British Columbia Mining Stock Board [†]	1877	1880		
Calgary General Stock Exchange				
Calgary Oil and Stock Exchange				
Calgary Petroleum Stock Exchange				
Canadian National Stock Exchange	2003	current		
Canadian Stock Exchange	1953		1974	Montreal Stock Exchange
Canadian Venture Exchange	1999	current		
Consolidated Mining and Oil Exchange (Toronto)	1929			
Dominion Stock Exchange [†]	1910	1911		
Edmonton Board of Trade	1889			
Edmonton Stock Exchange	1952	1957		
Halifax Board of Trade	1890			
Halifax Stock Exchange	1874			
Montreal Climate Exchange	2008	current		
Montreal Curb Market	1926		1953	Canadian Stock Exchange
Montreal Mining Exchange	1899			
Montreal Stock Exchange	1874		2008	Toronto Stock Exchange
Natural Gas Exchange	1994	current		
Pacific Coast Stock Exchange	1910			
Prince Rupert Stock Exchange [†]	1897	1900		
Prince Rupert Stock and Mining Exchange	1910			
Prince Rupert Stockbrokers Association	1909			

Notes: The entry “current” denotes a surviving exchange that continues to operate independently as of the date of this publication. A dagger (†) denotes a “short-lived” exchange with an estimated lifetime of three years or less. Alternate exchange names: Alberta Stock Exchange (Calgary Stock Exchange), Canadian Venture Exchange (TSX Venture Exchange), Montreal Climate Exchange (MCeX), Montreal Stock Exchange (Montreal Exchange).

Table 12: Canada, List of Exchanges (2)

Exchange Name	Start	End	Merger	Merger Partner
Rossland Exchange	1898	1908		
Rossland Stock Exchange of British Columbia	1898	1908		
Standard Mining and Metal Exchange (Toronto)				
Standard Oil Stock Exchange (Calgary)				
Standard Stock Exchange	1899		1901	Standard Stock and Mining Exchange
Standard Stock and Mining Exchange (Toronto)	1901		1934	Toronto Stock Exchange
Stewart Stock Exchange [†]	1897	1900		
Toronto Board of Trade	1845			
Toronto Futures Exchange	1984			Toronto Stock Exchange
Toronto Mining Exchange [†]	1898		1901	Standard Stock and Mining Exchange
Toronto Stock Exchange	1854	current		
Toronto Stock Exchange Curb				
Toronto Stock and Mining Exchange [†]	1868	1868		
Unlisted Stock Market	1929			
Vancouver Exchange [†]	1894	1985		
Vancouver Stock Exchange	1907		1999	Canadian Venture Exchange
Vancouver Stock Exchange Curb	1974			
Victoria Stock Exchange [†]	1905	1908		
Winnipeg Commodity Exchange	1887		2007	International Securities Exchange
Winnipeg Stock Exchange	1907		2000	Canadian Venture Exchange
Winnipeg Stock Exchange Curb				

Notes: The entry “current” denotes a surviving exchange that continues to operate independently as of the date of this publication. A dagger (†) denotes a “short-lived” exchange with an estimated lifetime of three years or less. Alternate exchange names: Standard Stock and Mining Exchange (Toronto Standard Stock and Mining Exchange), Toronto Stock Exchange Curb (Toronto Curb Market), Winnipeg Commodity Exchange (Winnipeg Grain and Produce Exchange).

A.1.4 Chile

Table 13: Chile, List of Exchanges

Exchange Name	Start	End	Merger	Merger Partner
Bolsa Electronica de Chile	1989	current		
Santiago Stock Exchange	1893	current		
Valparaiso Stock Exchange	1898	current		

Notes: The entry “current” denotes a surviving exchange that continues to operate independently as of the date of this publication.

A.1.5 China (PRC)

Table 14: China (PRC, including Hong Kong SAR), List of Exchanges

Exchange Name	Start	End	Merger	Merger Partner
China Financial Futures Exchange (CFFEX)	2006	current		
Dalian Commodity Exchange (DCE)	1993	current		
Far East Exchange	1969		1986	Hong Kong Stock Exchange
Hong Kong Futures Exchange (HKFE)	1976		2000	Hong Kong Stock Exchange
Hong Kong Mercantile Exchange (HKMEx)	2008	current		
Hong Kong Stock Exchange (HKEX)	1891	current		
Hong Kong Stockbrokers Association	1921		1947	Hong Kong Stock Exchange
Kam Ngan Stock Exchange	1971		1986	Hong Kong Stock Exchange
Kowloon Stock Exchange	1972		1986	Hong Kong Stock Exchange
Shanghai Futures Exchange (SHFE)	1999	current		
Shanghai Gold Exchange (SGE)	2002	current		
Shanghai Metal Exchange (SHME)	1992		1999	Shanghai Futures Exchange
Shanghai Stock Exchange (SSE)	1990	current		
Shenzhen Stock Exchange (SZSE)	1990	current		
Zhengzhou Commodity Exchange (ZCE)	1990	current		

Notes: The entry “current” denotes a surviving exchange that continues to operate independently as of the date of this publication.

A.1.6 France

Table 15: France, List of Exchanges

Exchange Name	Start	End	Merger	Merger Partner
Bluenext	2007	current		
Bordeaux Stock Exchange				
Euronext	2000		2007	NYSE
Liege Stock Exchange				
Lille Stock Exchange				
Lyon Stock Exchange				
MATIF	1986		1999	Paris Stock Exchange
MONEP	1987		1999	Paris Stock Exchange
Marseilles Stock Exchange				
Nancy Stock Exchange				
Nantes Stock Exchange				
Paris Stock Exchange	1850		2000	Euronext
Powernext	2001	current		
Toulouse Stock Exchange				

Notes: The entry “current” denotes a surviving exchange that continues to operate independently as of the date of this publication. Alternate exchange names: MATIF (Market for Fixed Income and Commodity Derivatives), MONEP (Market for Equity and Index Derivatives), Paris Stock Exchange (Paris Bourse).

A.1.7 Germany

Table 16: Germany, List of Exchanges

Exchange Name	Start	End	Merger	Merger Partner
Augsburg Stock Exchange	1815		1935	Bavarian Stock Exchange
Bavarian Stock Exchange	1935	current		
Berlin Stock Exchange	1685	current		
Bremen Stock Exchange	1682		2003	Berlin Stock Exchange
Cologne Stock Exchange	1553		1935	Dusseldorf Stock Exchange
Dresden Stock Exchange				
Dusseldorf Stock Exchange	1935	current		
Essen Stock Exchange			1935	Dusseldorf Stock Exchange
Eurex	1998	current		
European Energy Exchange	2001	current		
German Derivatives Exchange	1990		1998	SOFFEX
German Stock Exchange	1585	current		
Hamburg Stock Exchange	1558	current		
Hanover Stock Exchange	1787		2000	Hamburg Stock Exchange
Konigsberg Stock Exchange				
Leipzig Stock Exchange				
Lubeck Stock Exchange				
Mannheim Stock Exchange				
Munich Stock Exchange	1830		1935	Bavarian Stock Exchange
Nurnberg Stock Exchange				
Scoach Europe	2006	current		
Stuttgart Stock Exchange	1861	current		
Wareterminbörse Hannover	1998	2009		

Notes: The entry “current” denotes a surviving exchange that continues to operate independently as of the date of this publication. Alternate exchange names: Bavarian Stock Exchange (Munich Stock Exchange), European Energy Exchange (EEX), German Derivatives Exchange (DTB), German Stock Exchange (Frankfurt Stock Exchange), Wareterminbörse Hannover (Risk Management Exchange).

A.1.8 Ireland

Table 17: Ireland, List of Exchanges

Exchange Name	Start	End	Merger	Merger Partner
Belfast Stock Exchange	1895		1973	Irish Stock Exchange
Cork Stock Exchange	1886		1971	Irish Stock Exchange
Dublin Stock Exchange	1799		1971	Irish Stock Exchange
Irish Stock Exchange	1793	current		
Midland & Western Stock Exchange	1966			
New Stock Exchange [†]	1845	1847		
Northern Stock Exchange	1965			
Provincial Brokers Stock Exchange				

Notes: The entry “current” denotes a surviving exchange that continues to operate independently as of the date of this publication. A dagger (†) denotes a “short-lived” exchange with an estimated lifetime of three years or less. Alternate exchange names: Irish Stock Exchange (*The Stock Exchange*).

A.1.9 Italy

Table 18: Italy, List of Exchanges

Exchange Name	Start	End	Merger	Merger Partner
Bologna Stock Exchange			1991	Italian Stock Exchange
Florence Stock Exchange			1991	Italian Stock Exchange
Genoa Stock Exchange			1991	Italian Stock Exchange
Italian Derivatives Market	1994		2007	London Stock Exchange
Italian Interest Rate Derivatives Market	1992		2007	London Stock Exchange
Italian Stock Exchange	1991		2007	London Stock Exchange
Milan Stock Exchange	1808		1991	Italian Stock Exchange
Naples Stock Exchange			1991	Italian Stock Exchange
Palermo Stock Exchange			1991	Italian Stock Exchange
Rome Stock Exchange			1991	Italian Stock Exchange
Trieste Stock Exchange			1991	Italian Stock Exchange
Turin Stock Exchange			1991	Italian Stock Exchange
Venice Stock Exchange			1991	Italian Stock Exchange

Notes: Alternate exchange names: Italian Derivatives Market (*IDEM*).

A.1.10 Japan

Table 19: Japan, List of Exchanges (1)

Exchange Name	Start	End	Merger	Merger Partner
Central Japan Commodity Exchange	1996	current		
Fukuoka Futures Exchange	1893		2007	Kansai Commodities Exchange
Fukuoka Stock Exchange	1949		2000	Tokyo Stock Exchange
Hakata Rice Exchange				
Hiroshima Stock Exchange			2000	Tokyo Stock Exchange
Hokkaido Grain Exchange			1995	Tokyo Grain Exchange
Japan Securities Exchange [†]	1943	1945		
Jasdaq Securities Exchange	1976	current		
Kanmon Commodity Exchange	1805			
Kansai Agricultural Commodities Exchange	1993		1997	Kansai Commodities Exchange
Kansai Commodities Exchange	1997	current		
Kobe Grain Exchange	1952		1993	Kansai Agricultural Commodities Exchange
Kobe Raw Silk Exchange			1997	Kansai Commodities Exchange
Kobe Rubber Exchange	1952		1997	Osaka Mercantile Exchange
Kobe Stock Exchange			1967	Osaka Securities Exchange
Kyoto Stock Exchange	1884		2001	Osaka Securities Exchange
Maebashi Dried Cocoon Exchange			1998	Yokohama Commodities Exchange
Nagaoka Stock Exchange				
Nagasaki Stock Exchange				
Nagoya Grain and Sugar Exchange			1996	Chubu Commodity Exchange
Nagoya Stock Exchange	1886	current		
Nagoya Textile Exchange			1996	Chubu Commodity Exchange
Niigata Securities Exchange			2000	Tokyo Stock Exchange

Notes: The entry "current" denotes a surviving exchange that continues to operate independently as of the date of this publication. A dagger (†) denotes a "short-lived" exchange with an estimated lifetime of three years or less. Alternate exchange names: Central Japan Commodity Exchange (Chubu Commodity Exchange), Fukuoka Stock Exchange (Hakata Rice Exchange).

Table 20: Japan, List of Exchanges (2)

Exchange Name	Start	End	Merger	Merger Partner
Osaka Chemical Textile Exchange			1984	Osaka Textile Exchange
Osaka Grain Exchange	1952		1993	Kansai Agricultural Commodities Exchange
Osaka Mercantile Exchange	1997		2007	Central Japan Commodity Exchange
Osaka Sampin Exchange			1984	Osaka Textile Exchange
Osaka Securities Exchange	1878	current		
Osaka Sugar Exchange			1993	Kansai Agricultural Commodities Exchange
Osaka Textile Exchange	1984		1997	Osaka Mercantile Exchange
Sapporo Securities Exchange	1950	current		
Tokyo Commodity Exchange	1984	current		
Tokyo Gold Exchange	1982		1984	Tokyo Commodity Exchange
Tokyo Grain Exchange	1952	current		
Tokyo International Financial Futures Exchange	1989	current		
Tokyo Rubber Exchange	1952		1984	Tokyo Commodity Exchange
Tokyo Stock Exchange	1878	current		
Tokyo Sugar Exchange			1993	Tokyo Grain Exchange
Tokyo Textile Exchange	1951		1984	Tokyo Commodity Exchange
Toyohashi Dried Cocoon Exchange			1996	Chubu Commodity Exchange
Yokohama Commodities Exchange	1998		2006	Tokyo Grain Exchange
Yokohama Raw Silk Exchange			1998	Yokohama Commodities Exchange
Yokohama Stock Exchange	1879			

Notes: The entry “current” denotes a surviving exchange that continues to operate independently as of the date of this publication. A dagger (†) denotes a “short-lived” exchange with an estimated lifetime of three years or less. Alternate exchange names: Osaka Securities Exchange (Osaka Stock Exchange), Tokyo International Financial Futures Exchange (Tokyo Financial Exchange).

A.1.11 The Netherlands

Table 21: The Netherlands, List of Exchanges

Exchange Name	Start	End	Merger	Merger Partner
Amsterdam Power Exchange	1999	current		
Amsterdam Stock Exchange	1602		2000	Euronext
European Energy Derivatives Exchange	2002		2008	Amsterdam Power Exchange
European Options Exchange	1978		1997	Amsterdam Stock Exchange
Rotterdam Stock Exchange		current		

Notes: The entry “current” denotes a surviving exchange that continues to operate independently as of the date of this publication. Alternate exchange names: Amsterdam Power Exchange (APX-ENDEX; APX), Amsterdam Stock Exchange (Amsterdam Exchanges), European Energy Derivatives Exchange (ENDEX).

A.1.12 Norway

Table 22: Norway, List of Exchanges

Exchange Name	Start	End	Merger	Merger Partner
Ålesund	1905			
Bergen	1837			
Drammen	1839			
Fish Pool	2006	current		
Fredrikstad	1921			
Haugesund	1914			
International Maritime Exchange	2001	current		
Kristiansand	1837			
Kristiansund	1894			
Nord Pool	1993		2010	NASDAQ OMX
Nord Pool Spot	2002	current		
Oslo Stock Exchange	1818	current		
Sandefjord	1912			
Skien	1895			
Stavanger	1818			
Trondheim	1819			

Notes: The entry “current” denotes a surviving exchange that continues to operate independently as of the date of this publication. Alternate exchange names: International Maritime Exchange (Imarex).

A.1.13 Singapore

Table 23: Singapore, List of Exchanges

Exchange Name	Start	End	Merger	Merger Partner
Singapore Exchange (SGX)	1999	current		
Singapore International Monetary Exchange (SIMEX)	1984		1999	SES
Singapore Mercantile Exchange (SICOM)	2010	current		
Stock Exchange of Singapore (SES)	1973		1999	SIMEX

Notes: The entry “current” denotes a surviving exchange that continues to operate independently as of the date of this publication.

A.1.14 Spain

Table 24: Spain, List of Exchanges

Exchange Name	Start	End	Merger	Merger Partner
Barcelona Stock Exchange	1851	current		
Bilbao Stock Exchange	1890	current		
Citrus Fruit and Commodity Futures Market of Valencia	1995	current		
Madrid Stock Exchange	1831	current		
Mercado Continuo Español Sociedad de Bolsas		current		
Spanish Financial Derivatives Exchange	1989	current		
Valencia Stock Exchange	1980	current		

Notes: The entry “current” denotes a surviving exchange that continues to operate independently as of the date of this publication. Alternate exchange names: Spanish Financial Derivatives Exchange (MEFF).

A.1.15 Sweden

Table 25: Sweden, List of Exchanges

Exchange	Start	End	Merger	Merger Partner
Burgundy	2009	current		
Gävle Stock Exchange	1874	1901		
Gothenburg Stock Exchange	1863	1927		
Malmö Stock Exchange				
Nordic Growth Market	2005		2008	Stuttgart Stock Exchange
Norrköping Stock Exchange				
Örebro Stock Exchange				
Stockholm Stock Exchange	1863		1998	Swedish Futures and Options Market
Swedish Futures and Options Market	1985		2008	NASDAQ OMX

Notes: The entry “current” denotes a surviving exchange that continues to operate independently as of the date of this publication. Alternate exchange names: Nordic Growth Market (Nordic Derivatives Exchange), Swedish Futures and Options Market (OM Stockholm Exchange; OMX).

A.1.16 Switzerland

Table 26: Switzerland, List of Exchanges

Exchange Name	Start	End	Merger	Merger Partner
Basel Stock Exchange	1876		1995	SIX Swiss Exchange
Bern Stock Exchange		current		
Geneva Stock Exchange	1850		1995	SIX Swiss Exchange
Lausanne Stock Exchange				
SIX Swiss Exchange	1995	current		
Swiss Options and Financial Futures Exchange	1988		1998	German Derivatives Exchange
Zürich Stock Exchange	1873		1995	SIX Swiss Exchange

Notes: The entry “current” denotes a surviving exchange that continues to operate independently as of the date of this publication. Alternate exchange names: SIX Swiss Exchange (SWX Swiss Exchange), Swiss Options and Financial Futures Exchange (SOFEX).

A.1.17 Taiwan (ROC)

Table 27: Taiwan (ROC), List of Exchanges

Exchange Name	Start	End	Merger	Merger Partner
Taiwan Futures Exchange (TAIFEX)	1998	current		
Taiwan Stock Exchange (TWSE)	1962	current		

Notes: The entry “current” denotes a surviving exchange that continues to operate independently as of the date of this publication.

A.1.18 United Kingdom (England/N. Ireland and Scotland)

Table 28: England and Northern Ireland, List of Exchanges (1)

Exchange Name	Start	End	Merger	Merger Partner
Baltic Exchange	1744		1903	Baltic Mercantile and Shipping Exchange
Baltic Mercantile and Shipping Exchange	1903	current		
Birmingham Exchange	1861	1966		
Bradford Stock Exchange		1964		
Bristol Stock Exchange	1845	1966		
Carbon Trade Exchange	2010	current		
Cardiff Stock Exchange	1886	1966		
Chi-X	2007	current		
Corn Exchange of London	1745	1974		
Equiduct	2009	current		
FXMarketSpace	2007	2008		
globalCOAL	2000	current		
Halifax Stock Exchange		1965		
Huddersfield Stock Exchange	1899	1965		
Hull Stock Exchange				
International Petroleum Exchange	1980		2001	IntercontinentalExchange
Jerusalem Coffee House	1625		1891	London Shipping Exchange
Leeds Stock Exchange	1845	1965		
LIFFE	1982		2002	Euronext
Liverpool Rubber Exchange				
Liverpool Stock Exchange		1965		
London Coal Exchange	1805			
London Corn Exchange	1826		1929	Corn Exchange of London
London Iron and Steel Exchange	1919	1938		
London Metal Exchange	1877	current		
London Rubber Exchange				
London Shipping Exchange	1891		1903	Baltic Mercantile and Shipping Exchange
London Stock Exchange	1697	current		
Manchester Stock Exchange		1965		
Middlesbrough Exchange	1864			

Notes: The entry “current” denotes a surviving exchange that continues to operate independently as of the date of this publication. Alternate exchange names: Baltic Exchange (Baltic Coffee House; Virginia and Baltick Coffee House), LIFFE (The London International Financial Futures and Options Exchange).

Table 29: England and Northern Ireland, List of Exchanges (2)

Exchange Name	Start	End	Merger	Merger Partner
National Fund Exchange				
Newcastle-upon-Tyne Stock Exchange		1965		
Newport Stock Exchange				
Nottingham Stock Exchange		1966		
Oldham Stock Exchange		1965		
PLUS Markets Group	2005	current		
Reuters Dealing 2000/3000	1992	current		
Sheffield Stock Exchange	1844	1965		
Swansea Stock Exchange		1965		
The London Securities and Derivatives Exchange	1989		2008	NASDAQ OMX
The Wool Exchange				
Tradepoint Investment Exchange				
Turquoise	2008		2009	London Stock Exchange
UK Power Exchange	2000		2003	Amsterdam Power Exchange
Virginia and Baltic Coffee House	1744			
Virginia and Maryland Coffee House				
Virt-X	2001		2002	SIX Swiss Exchange

Notes: The entry “current” denotes a surviving exchange that continues to operate independently as of the date of this publication. Alternate exchange names and notes: The London Securities and Derivatives Exchange (OM London Exchange; OMLX), The Wool Exchange (as part of the London Exchange).

Table 30: Scotland, List of Exchanges

Exchange Name	Start	End	Merger	Merger Partner
Aberdeen Stock Exchange	1845		1964	Scottish Stock Exchange
City of Edinburgh Stock Exchange	1845		1854	Edinburgh Stock Exchange
City of Glasgow Stock Exchange	1845		1847	Union Stock Exchange
Dundee Stock Exchange	1879		1964	Scottish Stock Exchange
Edinburgh Stock Exchange	1844		1964	Scottish Stock Exchange
Edinburgh and Leith Stock Exchange [†]	1845	1845		
General Stock Exchange	1845		1847	Union Stock Exchange
Glasgow Stock Exchange	1844		1964	Scottish Stock Exchange
Greenock Stock Exchange	1888	1965		
Scottish Stock Exchange	1964		1973	London Stock Exchange
Scottish Western Stock Exchange [†]	1845	1845		
Union Stock Exchange	1847	1851		

Notes: A dagger (†) denotes a “short-lived” exchange with an estimated lifetime of three years or less.

A.1.19 United States

Table 31: US, List of Exchanges (1)

Exchange Name	Start	End	Merger	Merger Partner
A New Exchange (New York, NY)	1882			
A New Exchange (Portland, OR)	1887			
Albany Market				
American Board of Mining Industries (Chicago, IL)	1896			
American Mining Board (New York, NY)	1876			
American Mining Exchange (New York, NY)			1877	New York Mining Stock Exchange
American Mining Stock Exchange (New York, NY)	1880		1885	Consolidated Stock Exchange
American Stock Exchange (New York, NY)	1953		2008	NYSE Euronext
Another Stock Exchange (Boston, MA)	1890			
Archipelago (Chicago, IL)	1997		2006	NYSE Euronext
Arizona Stock Exchange (Phoenix, AZ)	1990	2001		
Ashland Commercial Stock Exchange (WI)	1887			
Aspen Mining Stock Association (CO)	1890			
Associated Stock Exchange				
Atlanta Mining and Stock Exchange (GA)	1891			
Atriax [†]	2000	2002		
Baltimore Market				
Baltimore Stock Exchange (MD)			1949	Philadelphia Stock Exchange
BATS Exchange (Lenexa, KS)	2005	current		
Birmingham Stock Exchange	1887			
Boise Mining Exchange (ID)	1896			
Boston Curb Exchange (MA)				
Boston Mining and Stock Exchange (MA)	1880			
Boston Options Exchange (MA)	2004	current		
Boston Stock Exchange (MA)	1834		2007	NASDAQ OMX
Boulder Mining Stock Exchange [†] (CO)	1896	1899		
Breckinridge Exchange				
Buffalo Stock Exchange (NY)	1929	1936		
Butte Mining Stock Exchange (MT)	1890	1910		
C2 Options Exchange (Chicago, IL)	2010	current		
California Gold Mining Exchange of San Francisco (CA)	1985			
California Oil and Stock Exchange (CA)	1900			
California Oil Exchange (San Francisco, CA)	1899		1900	Producers' Oil Exchange
California Stock and Exchange Board (CA)	1872			
California Stock Exchange (Los Angeles, CA)	1872			
California Stock and Oil Exchange (San Francisco, CA)			1910	San Francisco Stock Exchange
Carson City Stock Board (NV)	1863			
Chamber of Commerce of Minneapolis (MN)	1881			
Charlotte Stock Exchange (NC)				
Chicago Board Options Exchange (IL)	1973	current		
Chicago Board of Trade (IL)	1848		2007	Chicago Mercantile Exchange
Chicago Climate Exchange (IL)	2003	current		

Notes: The entry "current" denotes a surviving exchange that continues to operate independently as of the date of this publication. A dagger (†) denotes a "short-lived" exchange with an estimated lifetime of three years or less. Alternate exchange names and notes: American Stock Exchange (AMEX), Aspen Mining Stock Association (Aspen Mining Stock Exchange), Associated Stock Exchange (Manila, Philippine Islands), Boston Curb Exchange (Boston Market), Chicago Board Options Exchange (CBOE), Chicago Board of Trade (CBOT).

Table 32: US, List of Exchanges (2)

Exchange Name	Start	End	Merger	Merger Partner
Chicago Curb Exchange (IL)				
Chicago Mercantile Exchange (IL)	1874	current		
Chicago Metal Mining and Stock Exchange (IL)	1891			
Chicago Mineral and Mining Board (IL)	1986			
Chicago Mining and Stock Exchange (IL)	1878			
Chicago Mining Board (IL)	1879			
Chicago Mining Exchange (IL)	1882			
Chicago Mining Exchange (Boston, MA)	1880			
Chicago (IL) Mining Stock Exchange (1)	1891			
Chicago (IL) Mining Stock Exchange (2)	1907			
Chicago Stock Exchange (IL)	1882	current		
Cincinnati Market (OH)				
Cincinnati Stock Exchange (OH)	1885	current		
Citizens Mining Stock Exchange (Pueblo, CO)	1895			
Cleveland Market (OH)				
Cleveland Mining and Stock Exchange (OH)	1898			
Cleveland Mining Stock Market (OH)	1889			
Cleveland Stock Exchange (OH)	1900		1949	Chicago Stock Exchange
Coffee, Sugar and Cocoa Exchange (New York, NY)	1882		1998	New York Board of Trade
Colorado Mining and Exchange Board (Denver, CO)	1875			
Colorado Mining Stock Association (Colorado Springs, CO)	1894			
Colorado Mining Stock Exchange (Denver, CO)	1889			
Colorado Oil Exchange (Denver, CO)	1925			
Colorado Springs Board of Brokers Association (CO)	1899			
Colorado Springs Board of Trade Mining Exchange (CO)	1895			
Colorado Springs Ladies Board (CO)	1896			
Colorado Springs Mining Stock Brokers Association (CO)	1892			
Colorado Springs Mining Stock Exchange (CO)	1899			
Colorado Springs Open Board of Brokers (CO)	1895			
Colorado Springs Stock Exchange (CO)		1966		
Columbus (OH) Stock Exchange (1)	1902			
Columbus (OH) Stock Exchange (2)				
Commodity Exchange (New York, NY)	1883		1994	New York Mercantile Exchange
Consolidated Stock Exchange				
Consolidated Stock Exchange (Colorado Springs, CO)	1895			
Consolidated Stock Exchange (New York, NY)	1885			
Creede Mining Exchange (CO)	1892			
Cripple Creek Gold Mining Exchange (CO)	1895			
Cripple Creek Mining Stock Exchange (CO)	1892			
Cripple Creek Stock Exchange (CO)	1895			
Currenex (New York, NY)	1999	current		
Dallas Cotton Exchange (TX)	1907			
Deadwood Mining Stock Exchange (SD)	1887			

Notes: The entry "current" denotes a surviving exchange that continues to operate independently as of the date of this publication. Alternate exchange names: Chicago Curb Exchange (Chicago Market), Chicago Mercantile Exchange (CME; Chicago Produce Exchange), Chicago Stock Exchange (Midwest Stock Exchange), Cincinnati Stock Exchange (National Stock Exchange), Coffee, Sugar and Cocoa Exchange (New York Coffee Exchange), Commodity Exchange (COMEX; New York Metal Exchange).

Table 33: US, List of Exchanges (3)

Exchange Name	Start	End	Merger	Merger Partner
Denver Commercial Grain and Stock Exchange (CO)	1888			
Denver Mining and Stock Association (CO)	1887			
Denver Mining Stock Exchange (CO)	1879			
Denver Real Estate and Stock Exchange (CO)				
Denver Stock and Mining Exchange (CO)	1895			
Denver Stock Exchange (CO)	1899	1936		
Denver Stock Exchange and Board of Brokers (CO)	1897			
Detroit Stock Exchange (MI)	1901	1976		
Direct Edge (Jersey City, NJ)	2005	current		
Duluth Iron and Mining Exchange (MN)	1890			
Duluth Stock Exchange (MN)	1909			
East St. Louis Market (IL)	1901			
Eau Claire Mining Exchange [†] (WI)	1887	1890		
El Paso Mining Exchange (TX)	1894			
El Paso Mining Stock Exchange (TX)	1881			
Electronic Broking Services	1990	current		
Electronic Liquidity Exchange (New York, NY)	2009	current		
Elect. Mfg. and Mining Board (New York, NY)	1883			
Ely Mining Stock Exchange (NV)	1907			
Eris Exchange (Chicago, IL)	2010	current		
Esmeralda Stock Board (NV)	1863			
Fall River Market				
Florence Mining Stock Exchange (CO)	1896			
Foreign Exchange Capital Markets (New York, NY)	1999	current		
FXall (New York, NY)	2001	current		
Galena Mining Exchange (KS)	1896			
Galveston Oil Stock Exchange (TX)	1901			
Globe Mining Exchange (AZ)	1881			
Gold Hill Stock and Exchange Board (NV)	1864			
Golden Mining Stock Exchange (NM)	1900			
Goldfield Mining Stock Exchange (NV)	1905			
Goldfield Stock and Exchange Board (NV)	1906			
Great Falls Mining Stock Exchange (MT)	1891			
Hailey Mining Stock Exchange (ID)	1881			
Hartford Stock Exchange (CT)	1865	1934		
Haverly Mining Exchange (Boston, MA)	1880			
Haverly Mining Stock Exchange (New York, NY)	1880			
Helena Mining and Stock Exchange (MT)	1885			
Helena Stock Exchange (MT)	1890			
Honolulu Stock Exchange (HI)	1898	1977		
Honolulu Stock and Bond Exchange (HI)				
Hotspot FX (Jersey City, NJ)	2000	current		
Houston Cotton Exchange (TX)				
Houston Mercantile Exchange (TX)	2008	current		
Houston Oil Stock Exchange (TX)	1901			

Notes: The entry “current” denotes a surviving exchange that continues to operate independently as of the date of this publication. A dagger (†) denotes a “short-lived” exchange with an estimated lifetime of three years or less. Alternate exchange names: Hartford Stock Exchange (Hartford Market).

Table 34: US, List of Exchanges (4)

Exchange Name	Start	End	Merger	Merger Partner
Indianapolis Stock Exchange (IN)				
Intermountain Exchange				
International Securities Exchange (New York, NY)	2000		2007	German Stock Exchange
Joplin Stock Exchange (MO)	1907			
Kansas City Board of Trade (MO)	1856	current		
Kansas City Mining and Stock Exchange (MO)	1890			
Kansas City Mining Exchange (MO)	1888			
Lake City Mining Exchange Association (CO)	1892			
Laramie Mining and Stock Exchange (WY)	1896			
Leadville Mining and Stock Association (CO)	1882			
Leadville Mining Stock Association (CO)	1901			
Leadville Mining Stock Exchange (CO)	1896			
Light's Exchange (Virginia City, NV)	1863			
Los Angeles Curb Exchange (CA)			1934	Los Angeles Stock Exchange
Los Angeles Miners' Stock Exchange (CA)	1903			
Los Angeles Mining and Stock Exchange (CA)	1896			
Los Angeles Oil Exchange (CA)	1899		1957	San Francisco Stock and Bond Exchange
Los Angeles Stock and Mining Exchange (CA)	1897			
Los Angeles Stock Exchange (CA)			1957	Pacific Coast Stock Exchange
Los Angeles-Nevada Mining Stock Exchange (CA)	1907			
Louisiana Stock Exchange				
Louisville Stock Exchange (KY)		1935		
Maine Mining and Stock Exchange (Boston, MA)	1880			
Maine Mining Stock Exchange (Bangor, ME)	1880			
Manhattan Mining Stock Exchange (NV)	1917			
Manhattan Stock Exchange (NV)	1908			
Manila Stock Exchange (Philippine Islands)				
Matchbook FX (New York, NY)	1999	2002		
Memphis Cotton Exchange (TN)	1874	current		
Merchants' Exchange of St. Louis (MO)				
Metropolitan Stock Exchange (Boston, MA)	1891			
Metropolitan Stock Exchange (Cripple Creek, CO)	1896			
Metropolitan Stock Exchange (New York, NY)				
Mexican National Mining and Stock Exchange (NY)	1882			
MidAmerica Commodity Exchange (Chicago, IL)	1868		1880	Chicago Board of Trade
Milwaukee Grain and Stock Exchange (WI)	1929	1938		
Milwaukee Mining Exchange [†] (WI)	1887	1890		
Mineral and Mining Board (Chicago, IL)	1895			
Mining Stock Exchange (New York, NY)			1883	Consolidated Stock Exchange
Minneapolis Grain Exchange (MN)	1885	current		
Minneapolis Mining and Stock Exchange (MN)	1889			
Minneapolis Stock Bond and Mtg. Exchange (MN)	1891			
Minneapolis-St. Paul Stock Exchange (MN)	1929		1949	Chicago Stock Exchange
Miscellaneous Securities Board (New York, NY)	1882		1883	Consolidated Stock Exchange
Myers and Daggetts Mining and Stock Exchange	1863			
NASDAQ OMX (New York, NY)	1971	current		

Notes: The entry "current" denotes a surviving exchange that continues to operate independently as of the date of this publication. A dagger (†) denotes a "short-lived" exchange with an estimated lifetime of three years or less. Alternate exchange names: Los Angeles Curb Exchange (Los Angeles Market), Louisville Stock Exchange (Louisville Market), MidAmerica Commodity Exchange (Pudd's Exchange).

Table 35: US, List of Exchanges (5)

Exchange Name	Start	End	Merger	Merger Partner
Nashville Stock Exchange (TN)				
National Metal Exchange (New York, NY)	1928		1933	Commodity Exchange
National Mining and Stock Exchange (PA)	1881			
National Mining and Stock Exchange Co. (IL)	1891			
National Petroleum Board (New York, NY)	1882		1883	New York Mining Stock Exchange
National Petroleum Exchange (New York, NY)	1882		1883	Consolidated Stock Exchange
National Raw Silk Exchange (New York, NY)	1928		1933	Commodity Exchange
National Stock Exchange (1)				
National Stock Exchange (2) (Boston, MA)	1888			
National Stock Exchange (3)				
Nevada Mining Exchange (Reno, NV)	1926			
Nevada Stock Exchange [†] (San Francisco, CA)	1876	1877		
New Bedford Market (MA)				
New England Mining Exchange (Boston, MA)	1881			
New Haven Market (CT)				
New Orleans Cotton Exchange (LA)	1871	1964		
New Orleans Curb Exchange (LA)	1932			
New Orleans Stock Exchange (LA)	1875		1959	Chicago Stock Exchange
New York Board of Trade (NY)	1998		2007	IntercontinentalExchange
New York Cocoa Exchange (NY)	1925		1979	Coffee, Sugar and Cocoa Exchange
New York Commercial Association (NY)				
New York Cotton Exchange (NY)	1870		1998	New York Board of Trade
New York Curb Exchange (NY)				American Stock Exchange
New York Evening Exchange (NY)	1864			
New York Iron and Metal Exchange (NY)				
New York Mercantile Exchange (NY)	1872		2008	Chicago Mercantile Exchange
New York Mining Exchange (1)			1885	Consolidated Stock Exchange
New York Mining Exchange (2)				
New York Mining Exchange (3)	1896			
New York Mining Exchange (4)	1930			
New York Mining Stock Board (NY)	1864			
New York Mining Stock Exchange (NY)	1875			
New York Open Board of Brokers (NY)	1863		1869	New York Stock Exchange
New York Petroleum Board (NY)	1882			
New York Produce Exchange (NY)	1862			
New York Hide Exchange (NY)	1929		1933	Commodity Exchange
New York Real Estate Securities Exchange (NY)	1929			
New York Stock Exchange (NY)	1790	current		
Newark Market				
Nodal Exchange (Vienna, Virginia)	2009	current		
North American Derivatives Exchange (San Mateo, CA)	2004	current		
Northwestern Mining Exchange (St. Paul, MN)	1887			
Omaha Stock Exchange [†] (NE)	1930	1930		
OneChicago (Chicago, IL)	2002	current		
Open Board of Stock Brokers				

Notes: The entry "current" denotes a surviving exchange that continues to operate independently as of the date of this publication. A dagger (†) denotes a "short-lived" exchange with an estimated lifetime of three years or less. Alternate exchange names and notes: National Petroleum Board (National Petroleum Exchange), National Stock Exchange (3) (Erie Board), New York Evening Exchange (Gallagher's), New York Mercantile Exchange (Butter and Cheese Exchange), New York Stock Exchange (NYSE), North American Derivatives Exchange (HedgeStreet).

Table 36: US, List of Exchanges (6)

Exchange Name	Start	End	Merger	Merger Partner
Pacific Board of Brokers [†] (San Francisco, CA)	1863	1866		
Pacific Coast Stock Exchange	1957			
Pacific Stock Exchange (1)	1875		1904	San Francisco Stock and Exchange Board
Pacific Stock Exchange (2) (San Francisco, CA)	1882		2005	Archipelago
Park City Mining Exchange (UT)	1908			
Park City Mining Stock Exchange (UT)	1881			
People's Stock Board (Gold Hill, NV)	1864			
People's Board of Brokers (Virginia City, NV)	1863			
Petroleum Stock Exchange of New York (NY)	1864			
Petroleum and Stock Board (NY)			1883	Consolidated Stock Exchange
Philadelphia Market (PA)				
Philadelphia Mining and Stock Exchange (PA)	1879			
Philadelphia Mining Board of Trade (PA)	1881			
Philadelphia Petroleum Exchange (PA)	1883			
Philadelphia Stock Exchange (PA)	1790		2008	NASDAQ OMX
Philippine Stock Exchange of Manila				
Pi-Ute Board of Brokers (Gold Hill, NV)	1864			
Pioche Mining Stock Exchange (NV)	1909			
Pioneer Stock and Exchange Board (Reese River, NV)	1864			
Pioneer Stock Exchange of Chicago (IL)				
Pittsburgh Market (PA)				
Pittsburgh Petroleum Stock and Metal Exchange (PA)	1886			
Pittsburgh Stock Exchange (PA)	1894		1969	Philadelphia Stock Exchange
Portland Board of Brokers (OR)	1865			
Portland Mining Exchange (OR)	1897			
Portland Mining Stock Exchange (ME)	1880			
Portland Mining Stock Exchange (OR)	1900			
Portland Stock Board (OR)	1864			
Portland Stock Exchange and Mining Board (OR)	1887			
Portland Stock and Bond Exchange (OR)	1929			
Prescott Mining Stock Exchange (AZ)	1896			
Producers' Oil Exchange (San Francisco, CA)	1899			
Providence Market (RI)	1890			
Public Exchange (San Francisco, CA)	1864			
Public Stock Exchange (Boston, MA)	1886			
Pueblo Mining Exchange (CO)	1892			
Pueblo Mining Stock Exchange (CO)	1895			
Rawhide Mining Stock Exchange (NV)	1908			
Rawlins Mining Exchange (WY)	1896			
Reno Mining Stock Exchange (NV)	1906			
Reno Stock Exchange (NV)	1908			
Rialto Stock Exchange (Boston, MA)	1880			
Richmond Stock Exchange (VA)	1873	1972		
Rico Mining Stock Exchange (CO)	1882			
Rubber Exchange of New York (NY)			1933	Commodity Exchange
Sacramento Stock Board	1863			
Salida Mining Stock Exchange (CO)	1896			

Notes: The entry "current" denotes a surviving exchange that continues to operate independently as of the date of this publication. A dagger (†) denotes a "short-lived" exchange with an estimated lifetime of three years or less. Alternate exchange names: Philadelphia Stock Exchange (Baltimore-Washington), Pittsburgh Market (Curb), Providence Market (Providence Stock Exchange).

Table 37: US, List of Exchanges (7)

Exchange Name	Start	End	Merger	Merger Partner
Salt Lake City Mining Stock Exchange (UT)	1873	1986		
Salt Lake Mining Stock Exchange (Salt Lake City, UT)	1890			
Salt Lake Stock Exchange (Salt Lake City, UT)				
Salt Lake Stock and Mining Exchange (Salt Lake City, UT)	1895			
San Diego Stock Exchange (CA)				
San Francisco and Tonopah Stock Exchange [†]	1903	1904		
San Francisco Board of Brokers [†] (CA)	1863	1866		
San Francisco Curb Exchange (CA)			1938	San Francisco Stock Exchange
San Francisco Gold Mining Exchange (CA)	1895			
San Francisco Investment Board (CA)	1898			
San Francisco (CA) Mining Exchange (1)	1862	1967		
San Francisco (CA) Mining Exchange (2)	1907		1910	San Francisco Stock Exchange
San Francisco Oil Exchange (CA)	1901			
San Francisco Stock and Exchange Board (CA)	1862			
San Francisco Stock Exchange (CA)			1957	Pacific Coast Stock Exchange
San Francisco Stock and Bond Exchange (CA)			1927	San Francisco Stock Exchange
San Francisco Stock and Exchange Board (CA)				
Savannah Cotton Exchange (GA)				
Seattle Bond and Stock Exchange (WA)				
Seattle Curb and Mining Exchange (WA)	1928			
Seattle Grain Exchange (WA)				
Seattle Mining Exchange (WA)	1900		1935	Seattle Stock Exchange
Seattle Stock Exchange (WA)	1908	1942		
Seven Troughs Mining Stock Exchange (NV)	1908			
Sierra City Mining Stock Exchange (CA)	1887			
Spokane Board of Trade and Stock Exchange (WA)	1897			
Spokane Mining Exchange (WA)	1890			
Spokane Stock Exchange (WA)	1897	1991		
St. Louis Mining and Stock Exchange (MO)	1880			
St. Louis (MO) Mining Exchange (1)				
St. Louis (MO) Mining Exchange (2)	1874			
St. Louis Stock Exchange (MO)	1899		1949	Chicago Stock Exchange
Stock Exchange of Minnesota (Minneapolis, MN)	1892			
Stockton Mining Exchange Board	1863			
Syracuse Stock Exchange (NY)	1906			

Notes: The entry “current” denotes a surviving exchange that continues to operate independently as of the date of this publication. A dagger (†) denotes a “short-lived” exchange with an estimated lifetime of three years or less. Alternate exchange names: Salt Lake City Mining Stock Exchange (Salt Lake City Stock Exchange), San Francisco Curb Exchange (San Francisco Market), Seattle Mining Exchange (Seattle Mining Stock Exchange), Spokane Stock Exchange (Standard Stock Exchange of Spokane, WA).

Table 38: US, List of Exchanges (8)

Exchange Name	Start	End	Merger	Merger Partner
The Green Exchange (New York, NY)	2007	current		
The Independent Mining Exchange (Chicago, IL)	1895			
The Stock Exchange [†] (San Francisco, CA)	1863	1866		
The Stock Exchange Board [†] (San Francisco, CA)	1863	1866		
Toledo Produce Exchange (OH)				
Toledo Stock Exchange (OH)	1903			
Tombstone Mining Exchange (AZ)	1881			
Tonopah Divide Stock Exchange (NV)	1919			
Tonopah Stock Exchange (NV)	1900			
Trinidad Mining Stock Exchange (CO)	1896			
Utah Mine and Stock Exchange (Salt Lake City, UT)	1899			
Utah Stock and Mining Exchange (Salt Lake City, UT)	1909			
Utah Stock Board (Salt Lake City, UT)	1892			
Victor Mining Exchange (CO)	1896			
Victor Mining Stock Exchange (CO)	1895			
Virginia City Stock Board (NV)	1863			
Virginia Gold Mining Exchange (Virginia City, NV)	1896			
Wallace Stock Exchange (ID)	1915			
Washington Market (DC)				
Washington Stock Exchange (DC)	1881		1953	Philadelphia Stock Exchange
Washoe Stock Exchange [†] (San Francisco, CA)	1862	1865		
Washoe Stock Exchange (Virginia City, NV)	1863			
Western Miners' Exchange				
Western Oil Exchange (Denver, CO)	1901			
Wheeling Stock Exchange (WV)	1914	1965		
Wishart and Co.'s Petroleum Exchange				
Wm. G. Doubleday's Stock Exchange (Colorado Springs, CO)	1894			
Wonder Mining Exchange (NV)	1907			

Notes: The entry "current" denotes a surviving exchange that continues to operate independently as of the date of this publication.

A dagger (†) denotes a "short-lived" exchange with an estimated lifetime of three years or less.

A.2 List of Sources by Country

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