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How They Made News Pay: News Traders' Quest for Crisis-Resistant Business Models

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A shortened and edited version will be forthcoming as:

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Abstract

This paper discusses the problem, implied by Arrow's fundamental paradox of information, of how to make money from news. To earn money from important news, news traders need to tell the potential buyer what it is, yet once they have revealed it, the buyer no longer needs to pay. This paper discusses how historically this paradox made it difficult for news agencies to profit from selling important news during crises, and how they gradually developed new business models in response. It examines these models and investigates how they interacted with market structure, resulting in just a few international news agencies dominating the international news supply.

Keywords: news agencies — history, Reuters, Havas, the Associated Press, Wolff-Continental, ANP, Arrow's fundamental paradox of information, business models, sunk costs, market structure — history, quasi-public goods/toll goods, financial crises, Kenneth J. Arrow

JEL Codes: L1, L15, L82, L86, L87, L96, N70, N80, Z10.

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Today just a few news agencies, such as Reuters, the Associated Press and AFP, dominate the international supply of raw news.[2] They make money from news even though it is protected rather imperfectly by intellectual property rights, even though it can be endlessly copied, and even though news gets old quickly. Despite these challenges, these news agencies have dominated the international news trade since

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[2] The author would like to thank Paul Auerbach, Richard R. John, Mary Morgan, Oliver Volckart, Peter Putnis, Richard Roberts, Steve Schifferes, Peter Scott, Jonathan Silberstein-Loeb and Krim Talia for comments and suggestions, as well as Jeff Hulbert and John Hobart for steering the paper through the editorial process. Previous versions benefited from comments received at the workshop on the history of the business press, University of Uppsala, at the International Economic History Association Conference in Helsinki, at the British Academy of Management Conference in Belfast, and at the Journalism and the Global Financial Crisis Symposium, City University, London. The research for this paper was partially funded by the Social and Economic Research Council (U.K.) and the Advanced Institute of Management Research under the ESRC/AIM Ghoshal Fellowship Scheme, grant number RES-331-25-3012. The author alone, of course, is responsible for the final text and any errors of fact or interpretation that may remain.

the mid-nineteenth century. They survived the rise of mass-circulation newspapers that had their own correspondents, as well as the advent of radio, television and the internet.

This paper examines how this handful of firms came to dominate the international raw news supply, how these agencies have been able to make money from raw news, and what business models they developed to this end. We examine how these business models interacted with market structure, and how they held their ground during crises.

These questions are relevant because news agencies are the key link between news as it happens and the buyers of raw news, such as the news media, financial firms and government departments, and it is worthwhile to know how the few organisations that provided the service were able to dominate the market. Since crises can have huge impacts on our world, it is important to examine how news agencies' business models worked during crises.

To answer these questions we will examine especially the period in which these business models emerged, and we will look at theory that can explain how news traders operated. We will focus on history and theory to answer these questions, and in that way we hope to provide a unique historical contribution to the debate about the role of news agencies in our news supply today. We will start with reviewing some stylised facts about the very long-run history of news agencies. Then we will look at the changes in the structure of the news market during the nineteenth century. Then we will discuss the business models that news agencies developed to make money from news and from crises, and then we examine how their business model held up during crises. Our method is historical, analytic and economic. We restrict ourselves here to international news agencies that aim to offer their customers global coverage. We will not deal with the development of the technological infrastructure, for which different works can be consulted.[3]

The evolution of news agencies

This section will briefly outline the evolution of the trade in raw news.[4] Since the Middle Ages news has been traded in many different ways. Before the sixteenth century a major form of news provision was through letters. As a reciprocal custom, diplomats and merchants wrote the latest news and prices at the bottom of letters. Some news brokers sold hand-copied newsletters to which customers could subscribe, and many cities had a news caller who verbally told the latest news for a fee. In the sixteenth century, trading exchanges started to issue newsletters with daily price data and sell these to those outside of the exchange. A few large, geographically spread-out organisations set up an internal news service. The Fuggers of Augsburg, for example, one of the biggest financers of their day, had their own messaging service.[5] During the seventeenth century, independent news services became more prominent, such as Abraham Casteleyn's regular news services, operated from Haarlem in the Netherlands.[6] In seventeenth century Britain some newsletter writers received fees of £20 per annum from noblemen for regular newsletters. At the end of the century annual charges for weekly newsletters varied between £3 and £6, as the increase in printed news kept a lid on prices.[7] Social

[3] On the interaction between the development of new communication technologies and news agencies see Gerben Bakker, "Trading Facts: Arrow's Fundamental Paradox and the Origins of Global News Networks" in: Peter Putnis, Chandrika Kaul and Juergen Wilke eds., *International Communication and Global News Networks: Historical Perspectives* (Hampton Press / International Association of Media and Communication Research, 2011), pp. 9-54.
[4] For an extensive historical overview see Bakker, "Trading Facts."
[5] It is still disputed whether the Fuggers' news service was also meant for outside customers.
[6] J. A. Baggerman and J. M. H. Hemels, *Verzorgd door het ANP: Vijftig jaar nieuwsvoorziening* (Utrecht and Antwerpen: Veen Uitgevers, 1985), p. 16. The liberal climate in Dutch Republic may have been important. The Republic was one of the few states allowing the free reporting of domestic news, whereas many other states only allowed foreign news to be reported.
[7] David Zaret, *Origins of democratic culture: printing, petitions, and the public sphere in early modern England* (Princeton, Princeton University Press, 2000), p. 127.

circles might also circulate letters containing news. In France the salons that some upper-class people maintained circulated newsletters. In eighteenth century Paris, for example, Mrs. M.-A. L. Doublet ran a salon for her friends of the Paris elite, where news was gathered, reliability assessed and then copied by hand to be sent out to selected friends, who might copy it further. Inhabitants of the provinces were happy to pay six livres a month to subscribe to the newsletter.[8]

In the eighteenth and nineteenth century specialised news agencies started to emerge. An early one was Lloyd's of London, which published *Lloyd's list*, containing ship arrivals and departures for most harbours in the world, ship losses, exchange rates, prices and other information. Among subscribers were merchants, insurance companies and government departments. In many countries also smaller national news agencies emerged, such as Agence Garnier in France. The Dutch newspaper the *Gazette de Leyde* also maintained an international network in the mid-eighteenth century. During the nineteenth century the Times of London employed several foreign correspondents. In 1837 it set up a pigeon service to get fast stock quotations from the continent.

During the 1840s and 1850s many of the modern news agencies emerged, such as Havas in France, which acquired a number of older news agencies, Reuters in Britain, Wolff-Continental in Germany and the New York Associated Press in New York. Making use where they could of the new electric telegraph, these agencies set up worldwide networks of correspondents and had as their main customers newspapers, governments, merchants, banks, insurance companies and other

[8] Robert Darnton, 'An Early Information Society: News and the Media in Eighteenth-Century Paris,' *American Historical Review*, Vol. 105 (2000), pp. 1-35.

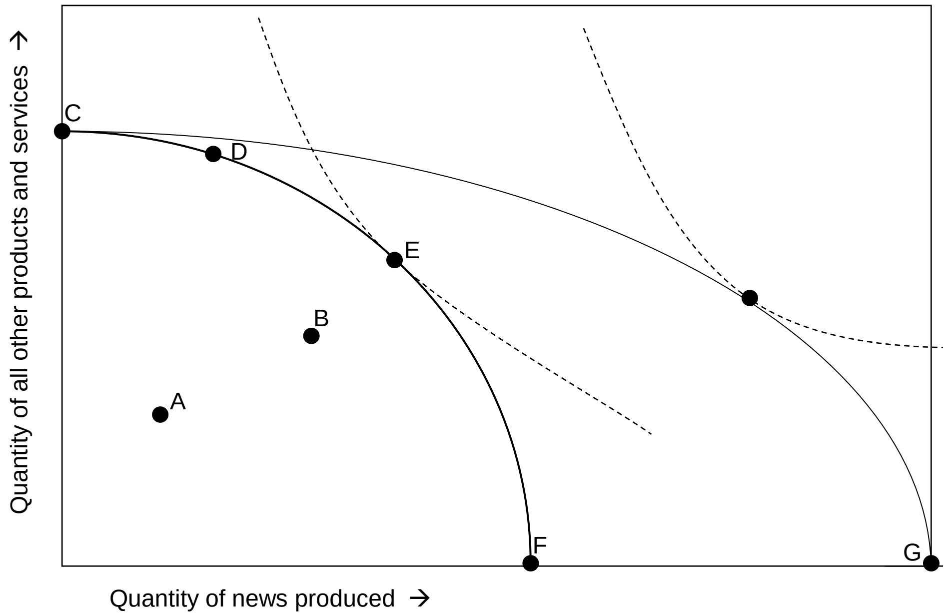

Diagram 1. *Hypothetical production possibility frontier for the quantity of raw news facts produced and the quantity of all other goods and services.*

businesses. By the 1860s the four main agencies had divided up the world in spheres of influence and stopped competing directly with each other. This international news cartel would remain in force, in various incarnations, well into the twentieth century.

The production possibility frontier (PPF), developed by Gottfried von Haberler in the interwar period, can help to conceptualise the radical change brought about in the news trade during the nineteenth century.[9] The PPF is a line that reflects all the production possibilities in an economy that maximise output (Diagram 1). If a country can produce only hundred tons of butter or hundred tons of guns, then the PPF gives all possible maximising combinations. If we picture guns and butter on two axes then on one extreme hundred tons of butter are produced and at the other extreme hundred tons of guns, and the PPF also shows all maximising combinations in between. Many economies, however, will not produce those maximising

[9] Gottfried Haberler, "The Theory of Comparative Costs and Its Use in the Defense of Free Trade", *Selected Essays* (1930), pp. 3-19.

Diagram 2. *Qualitative analysis of successive shifts in the production possibility frontier for raw news during the nineteenth century.*

Exogenous technological change	First-order outward shift of PPF related to news	Second-order outward shift of PPF related to news
Good and cheap telescopes	Printing press (15^{th} c. -)	Trading news
Electricity	Postal pigeons (18^{th} -)	Local news agencies
Magnetism	Optical telegraph (1790s -)	International news agencies
Literacy	Electric telegraph (1830s -)	Global news agencies

Note: PPF = Production possibility frontier (see text).
Sources: see text and Bakker (2011).

combinations, but something suboptional, such as combination A or combination B in Diagram 1.

Dynamic efficiency is a process in which the PPF is being pushed outwards continuously. A PPF can show the trade-off of a society in consuming raw news and all other products. Inside the frontier C-F, say from A to B, we can get more of both goods by using more efficient existing technology. At the frontier, starting from C to D, initially we get lots more raw news by giving up a little of all else (e.g. C – D_y yields D_x in Diagram 1), but eventually we get less and less additional news for an additional amount of other goods we give up (close to point F on the curve, giving up a lot of all else yields only a little bit more news).

Point D is productively efficient as it is on the PPF, but not allocatively efficient, as it is not on the highest utility curve possible, unlike point E, which is both. The second PPF C-G shows the effect of dynamic efficiency, brought about by innovations such as the optical and electric telegraphs.

During the nineteenth century, several exogenous innovations ranging from good and cheap telescopes becoming available to new discoveries about electricity and magnetism, shifted the PPF outwards, and entrepreneurs jumped on it by building visual and electrical telegraph lines (Diagram 2). This in its turn shifted the PPF for news and all other goods further outwards, and the entrepreneurs that founded the modern news agencies in their turn, used these innovations to innovate in the trade in news. The demand for their services was also stimulated by technological and societal change, such as increasing literacy, the rise of stock exchanges, urbanisation, increasing international trade, a larger market and mass-printing technologies.[10]

The changing market structure of news

Four tendencies are visible in the evolution of most media industries. These tendencies each consist of a basic economic characteristic that has an implication for changes over time. Interacting with history, this leads to particular historical expressions (Diagram 3).[11] In the case of news, sunk costs led to a quality race, leading to a handful of news agencies dominating the international news trade after the 1850s; the fact that marginal revenues equalled marginal profits stimulated vertical integration,[12] as for example expressed in the many news cooperatives across the world and the Press Association's acquisition of Reuters; the toll good character of news led to business models focused on ways to exclude customers so a fee could be asked. And the project-based character of news gathering led often to agglomeration and co-location of news traders with other media industries. In this section we will focus on sunk costs, marginal revenues equalling marginal costs and

[10] For a general discussion of these changes in demand see Gerben Bakker, *Entertainment Industrialised: The Emergence of the International Film Industry, 1890-1940* (Cambridge University Press, 2008).
[11] This model for historical analysis of media industries is discussed in more detail in Gerben Bakker, 'Sunk Costs and the Dynamics of Creative Industries' in Candace Jones, Mark Lorenzen and Jonathan Sapsed eds., *The Oxford Handbook of Creative Industries* (Oxford University Press, 2013, forthcoming)..
[12] The importance of the capture of marginal revenues for media organizations is further explored in Gerben Bakker, 'The Making of a Music Multinational: Polygram's International Businesses, 1945–1998', *Business History Review*, 80 (2006), pp. 81–123, and in Gerben Bakker, 'Adopting the Rights-Based Model: Music Multinationals and Local Music Industries since 1945', *Journal of Popular Music History*, Vol. 6 No. 3 (2011), pp. 311-349. Oliver E. Williamson, *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting* (The Free Press, 1985), and John Roberts, *The Modern Firm: Organizational Design for Performance and Growth* (Oxford University Press, 2004) provide theories to explain why activities are done within or without an organization.

Diagram 3. *Major economic characteristics of the news trade and their dynamic and historical implications for the business of gathering and selling news.*

Economic characteristic	Dynamic implication	Historical expression
Sunk costs	Quality race	Emergence and rise to dominance of a handful of agencies during the 1850s
Marginal revenue = marginal profits	Vertical integration Dual market structure	News agencies often owned by cooperatives of newspapers AP; merger of Reuters with the Press Association (1919); Australian news cooperative; Dutch news cooperative (1930s)
Toll-good character (non-diminishable but excludable)	Business models	Focus on sellable economic data since 16^{th} century Subscription models Copyright (since late 19^{th} century)
Project-based character	Agglomeration	Most news agencies in metropolises, co-located with customers, other news companies and other media industries.

Source: based on the framework introduced in Gerben Bakker, 'Sunk Costs and the Dynamics of the Creative Industries: A Very Long-Run Perspective', in Candace Jones, Mark Lorenzen, and Jonathan Sapsed (eds.) *Oxford Handbook of Creative Industries* (Oxford University Press, 2014, forthcoming).

the project-based character of the news business. The toll good character will be discussed in the next section.

During the nineteenth century, the market for news grew enormously. Demand increased because of growing literacy, growing political debate concomitant with newly won parliamentary representation, and rapid population and income growth. On the supply side, new ways of mass-printing reduced the average cost of a newspaper copy, and the visual and electrical telegraphs enabled more rapid news delivery. Because these new technology also diminished response times of persons involved in the news, the news cycles probably shortened and the intensity of the news likely increased.

Given that many costs of news traders were fixed and sunk and did not increase proportionally to the number of messages once their network is complete, a larger market led to higher profits. As the news market grew rapidly, more news traders should enter the business, attracted by the larger potential profits, and industrial concentration, the market share of the largest firms, should decrease. What we see in practice, however, is that from the 1850s just a few large organisations come to dominate the international trade of raw news, and that few new firms successfully challenged these incumbents.

This is a puzzle, and while the answer to it will lie in the confluence of several different factors, we will first focus here on the underlying economic mechanism, that is related to the nature of costs in news broking and the cost and benefits from quality and capability increases.

A substantial amount of the costs of international news agencies were fixed and/or sunk. Fixed costs are costs that do not increase with output over the period examined, and sunk costs are costs that are incurred once, that must be incurred to enter in the business and cannot be recovered when a firm exits the business. It is clear that for a news agency many costs were fixed, such as the salaries of correspondents, leased telegraph lines, rents for offices, maintaining a pigeon service. Variable costs included free-lance correspondents paid per word or news item, the ad-hoc lease of telegraph wires, and telegraphing messages for a per-word fee. One could also argue that some of these costs were sunk: the costs involved in setting up the network of correspondents, in building a client list and in establishing a reputation for reliable news.

Given the large share of fixed and sunk costs, an increase in the size of the market means that the revenues of a news agency will increase, but that the costs will not increase proportionally, so that profits for the existing level of quality will have increased. Now, two things can happen in such a situation: attracted by the greater profits, new entrants may enter the raw news market, or existing firms may spend more on their fixed and sunk costs to increase quality, as the reward for quality has now become higher. Which of the two effects has the upper hand depends on the pattern of technology and tastes: 'technology' determines how expensive it is to increase quality, and tastes determine the reward that the buyers in the market are given for better quality.[13]

It is likely that the second effect dominated in the raw news market during the second half of the nineteenth century. It was relatively easy to increase quality, which meant that it was profitable for the incumbents to spend a lot of money to do this. In raw news provision, ways to increase quality and capabilities included a) the increase of network coverage, of the number of locations in the world from which news was gathered, b) to increase reliability and reputation by investing in fact-checking, by hiring the best and fastest talent (correspondents and reporters in this case) c) the increase in the variety of news items offered, such as politics, business, sports, arts, science and human interest bundles, and d) offering additional services such as photographs, advertising and financial services.

On the demand side, the reward for better quality was high. Many businesspeople would profit from getting information slightly earlier than rivals, and newspapers were willing to pay a lot of money to get news earlier than rivals, or at

[13] On sunk costs see John Sutton, *Technology and market structure: Theory and history* (Cambridge MA: MIT Press, 1998); for a discussion of the relevance of sunk costs for the history of media industries see Gerben Bakker, "The Decline and Fall of the European film industry: Sunk costs, market size and market structure, 1890–1927," *Economic History Review*, vol. 58 (2005), pp. 310–51; 317–22; for a historical discussion of the problem of financing sunk costs see Gerben Bakker, 'Money for Nothing: How Firms Have Financed R&D-Projects since the Industrial Revolution', *Research Policy*, Vol. 42 (Dec. 2013), pp. 1793-1814.

least to have a guarantee not to get it later. The *New York Herald*, for example, offered $500 for every hour that it received important European news earlier than its rivals. A lot of the premium centred on speed and accuracy. With faster news cycles, the premium on this may have increased. Even nowadays financial news services such as those run by Dow Jones, can ask premium subscription fees from subscribing firms because they generally can deliver important business news a few seconds earlier than many other services. For smaller newspapers, subscription to a news agency with a large network coverage and bundles including specialised items were probably important, as they allowed them to do without many specialised reporters or correspondents. Also, the spread of international investments and of empires during the late nineteenth century may have increased the demand for international news. The emergence and growth of stock exchanges during the nineteenth century probably had a similar effect. More generally, the enormous growth in newspaper circulation during the nineteenth century increased the demand for news and the willingness of newspapers to pay for high-quality raw news.

On the supply side, it became relatively easy to increase quality because the electric telegraph lines made it easier to add correspondents to an existing network, and they increased the speed of communication. The increasing capacity of telegraph lines during the late nineteenth century, when capacity per wire increased several times by using new ‘multiplex’ and other technology, made is easier to offer bundles of specialised news as well. Also, as noted above, the news feedback cycle intensified, meaning there was more news to report per time period, while news agencies’ fixed costs did not increase proportionally. More trained professional journalists became available, making hiring easier, and photography became available, and during the early twentieth century telegraph transmission of photographs became possible.

Since it became easier to increase quality and because at the same time the reward for better quality increased, paradoxically it became profitable for entrepreneurs and especially the larger incumbent firms to spend far more on increasing quality, as the costs became lower and the rewards higher, and so they were easily willing to outspend rivals. This explanation could explain why we see an enormous increase in the market for raw news since the nineteenth century, yet no decrease in industrial concentration. In national news markets, in many countries we see the same trend: a sharply increasing market for raw news and just a few national news agencies, sometimes only one.

Although the economic explanation above is a likely one, given the nature of history and of the historical evidence, it is impossible to prove that this was the one and only explanation for what happened. It is clear that several other factors were important as well. First, access to telegraph wires was scarce and costly, especially initially, with a single or just a few providers, and sometimes required a lot of lobbying to obtain. Second, from the start, governments were very much involved with their national news agencies, and may have limited the possibilities of new international entrants. The German government even provided financial support for Wolff-Continental, and a century earlier the British Admiralty had relied heavily on *Lloyds List* and Lloyd’s news services in times of war. Third, the international news cartel limited entry and kept industrial concentration high–yet one could argue that if the economic fundamentals of news provision had been different then it would have been far more difficult to maintain the cartel. Fourth, in national news markets national news agencies were often vertically integrated with newspapers in an exclusive cooperative arrangement, thus making it difficult for new entrants to find customers.

The situation brought about by the quality race and other factors discussed above resembled a dual market structure often seen in markets were marginal costs are extremely low: a few large firms dominated the international market and national markets, complemented by a fringe of smaller organisations such as regional news agencies, specialised news agencies such as *Lloyd's List*, and networks of correspondents of newspapers. The dual market structure resulted from the economic characteristic that given that a large part of costs were fixed and sunk and reproduction costs were low, marginal revenues to a large extent equalled marginal profits (Diagram 3). This characteristic stimulated vertical integration, because with vertical integration, the producer had an incentive to incur more sunk costs as long as they led to more marginal revenues. With outright selling, it would be mainly the final seller or retailed who captured the marginal revenues and the producer therefore might not be willing to incur higher sunk costs. The Associated Press, for example, was willing to sink large amounts in its reporting, because its owners, the newspapers, would earn the marginal revenues that these additional outlays generated.

Another economic characteristic, the project-based character of news gathering led often to agglomeration and co-location of news traders with other media industries. Reuters, Wolff-Continental, Havas, Associated Press were all obviously located in big media districts in their respective countries, close to their customers, to competitors, to news suppliers and to other media industries (Diagram 3).

In terms of timing we see from the 1830s an increasing use of the visual telegraph and postal pigeons, from the 1840s the use of the electric telegraph, and a sharp increase in the raw news market throughout the entire nineteenth century. From at least the 1860s the market for international news was highly concentrated.

Business models: the fundamental paradox of information

The development discussed above, with news agencies incurring outlays to increase quality and customers willing to pay a premium for a higher quality of raw news provision, could only happen because news agencies were able to ask money for their services; they could set a price for it and be paid for it. Though for many industries this may seem self-evident, for news provision it was not.

As the news agencies developed, they had to devise new ways of organizing and transacting to make the gathering and distribution of news profitable. The major challenge they faced was being able to trade information for money. According to the "fundamental paradox in the determination of demand for information," put forward by the economist and Nobel laureate Kenneth J. Arrow, buyers cannot assess how much they would want to pay for information without knowing its content, but once they know its content, they no longer need to pay: "its value for the purchaser is not known until he has the information, but then he has in effect acquired it without cost."[14] This made selling news piece by piece rather problematic.

The diplomats and merchants of the Renaissance, who noted the latest news at the bottom of their letters, and later the exchanging newspapers in the United States and elsewhere used reciprocity as a mechanism to make the marginal price

[14] Kenneth J. Arrow, "Economic Welfare and the Allocation of Resources for Invention," in: Richard Nelson ed., *The Rate and Direction of Inventive Activity* (Princeton, NJ: NBER / Princeton University Press, 1962), pp. 609-626; 615.

Diagram 4. *Measurable Properties of Economic, Political, and Social Qualities.*

Quality	Measurable Property	Typical Range of Numerical Values	Typical Sources
Scarcity	Price	⟨0, →⟩	Price currents
	Quantity	[0, →⟩	Imports/exports (bills of entry)
Terms of trade	Exchange rate	⟨0, →⟩	Price currents
Reputation	Credit rating	{0, 1}	Letters; reports of credit agencies
Existence of a ship	Arrival in a harbour	{0, 1, ∅}	*Lloyd's List*
Scarcity of the future	Interest rate	⟨0, →⟩	Price currents
Scarcity of a firm's total assets	Share price	⟨0, →⟩	Price currents; newspapers
Change of executive and/or legislative branch of the state	Outcome of the election; detailed election results	{0, 1}; [0, n]	Newswires; newspapers
Performance of armies in known military battle	Outcome of the battle; losses/casualties	{0, 1}; [0,→⟩	Newswires; newspapers
Contestants' performance in sports match	Sports match outcome; contestants' score	{0, 1} ; [0, →⟩	Newswires; newspapers
Prevailing opinion in a population	Responses to survey	[0, 100]	Newswires; newspapers

Note: numerical values are expressed in standard mathematical domain ranges, where, for example, a square bracket includes a value, whereas a diagonal bracket excludes it. For example, ⟨0, →⟩ implies that the numerical values are above zero, {0, 1} that a battle has been lost (0) or won (1) and {0, 1, ∅} implies that a ship can be listed as lost (0), can be listed as arrived (1), or is not listed (∅). [0, n] refers to a definite range, where n depends on the size of the respective legislature.
Source: See the section "Evolution of news agencies" and its sources; Gerben Bakker, 'Trading Facts: Arrow's Fundamental Paradox and the Origins of Global News Networks', in Peter Putnis, Chandrika Kaul, and Jürgen Wilke (eds.) *International Communication and Global News Networks: Historical Perspectives* (Hampton Press / International Association of Media and Communication Research, 2011), pp. 9–54..

of the news zero, even though the marginal cost to the news supplier might have been higher than zero. [15]

[15] See the previous section.

The early modern news traders suffered less from Arrow's paradox when they supplied trade information that consisted of the numerical value of a measurable property of an economic quality. Six main categories of values were traded (Diagram 4). First, a price was a measurable property of the economic quality "scarcity" and was abundantly traded in letters and through price currents. Imported and exported quantities at specific ports, as tabulated in bills of entry, formed another measurable property of scarcity.[16] Second, exchange rates formed a measurable property of the general terms of trade between two areas. A third important category, which was more often dealt with in private correspondence and internal news services, such as that of the Fuggers, was the reputation of clients or trading partners.[17] The quality "reputation" had the measurable property "credit rating," which in theory could be "creditworthy" or "not creditworthy," or some steps on an ordinal scale in between. Money could be asked for by simply mentioning the quality (reputation or creditworthiness) and supplying qualitative information from which the buyer could distil a judgement, or, as would happen during the nineteenth century, a numerical value itself (the credit rating) could be sold.[18] Morse would later mention inquiries about creditworthiness as an important potential application of the telegraph.[19]

A fourth category was formed by ship arrivals in harbours, such as that supplied in *Lloyd's List*, a measurable property of the quality "existence of a ship,"

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[16] See, for example, John J. McCusker, 'The Business Press in England Before 1775', in: *Essays in the Economic History of the Atlantic World* (Routledge, 1997), pp. 149–67.
[17] On the importance of reputation, see for example, Paul R. Milgrom, Douglass C. North and Barry R. Weingast, "The role of institutions in the revival of trade: The law merchant, private judges and the Champagne fairs," *Economics and Politics,* vol. 2 (1990), pp. 1–23.
[18] Information on a trading partner's reputation (such as for payment, respect of deadlines, and fidelity to the terms and objects of the contract) remained important business information throughout history. Alessandro Stanziani, "Economic information on international markets: French strategies in the Italian mirror," *Enterprise & Society,* vol. 11 (2010), pp. 26–64, for example, shows the importance of this information for French and Italian merchants between 1870 and 1914, and how Italian wine exporters had an advantage over their French competitors as the Italian government provided them with detailed information on the reputation of foreign trading partners. On credit rating agencies in the United States in the second half of the nineteenth century see Martin Ruef and Kelly Patterson, "Credit and Classification: The impact of industry boundaries in nineteenth-century America," *Administrative Science Quarterly,* vol. 54 (2009), pp. 486–520.
[19] Menahem Blondheim, *News over the Wires: The Telegraph and the Flow of Public Information in America* (Harvard University Press, 1994).

which was useful for insurers, large trading companies, and navies.[20] Later, share prices and interest rates would become two important new categories, measurable properties of the scarcity of a firm's total (tangible and intangible) assets and of the scarcity of the future, respectively. For each of these six economic qualities, the seller could advertise its measurable property, and was able to only reveal its numerical value after having been paid, thus resolving Arrow's paradox. It was still impossible to ask premiums for unexpected changes in numerical values, such as price implosions, exchange rate collapses, or the loss of an entire merchant convoy, such as the capture of the Spanish silver fleet by the Dutch Republic.[21]

Business news could be sold because the seller could inform the buyer what particular economic quality the information would be about, and what measurable property of it was contained in it, without revealing the actual numerical value. In theory, general news also could be sold in this way, but by saying that one had information about a political upheaval in Spain or about events affecting future grain prices one already had revealed important information: that something had happened in Spain, that it was political, and that it was important, or that something had happened that would affect grain prices. Yet one had not revealed enough about the information's reliability and detailed content for the buyer to establish what he was willing to pay.

Some general news did have measurable properties that could be specified in advance without revealing their numerical value. The main such categories were election results, sports results and, to a lesser extent, the outcome of known military

[20] For credit rating and ship arrivals, the information was binary (creditworthy or not creditworthy, ships on the list of the information buyer have arrived or not).

[21] See the discussion of early news services in the preceding section. Nevertheless, the early newspapers of the sixteenth and seventeenth centuries were typically sold by subscription payable in advance, suggesting Arrow's paradox may have been an issue in selling them. Subscriptions and lower printing costs made the capital outlays needed for early newspapers smaller than for books. Paul Starr, *The Creation of the Media: Political Origins of Modern Communications* (New York, Basic Books, 2004), p. 32.

battles (Diagram 4). Contrary to the economic categories, these three categories involved irreversible win-or-lose outcomes, although the intermediate election results, losses, or match scores could be reported in instalments. As a rule of thumb, any information on which one could place a definite bet, and for which thus in theory a futures market was possible, was at least partially tradable and suffered less from Arrow's paradox: The buyer knew on which economic quality information was needed and the number of measurable properties was a closed set, usually containing just a single property, with each property having a defined range (Diagram 4). Other news was largely unexpected in quality, almost by its nature, as that was its main selling point. The emergence of opinion polls can probably be explained by the desire of polling firms to first create measurable properties for some news events and then sell their numerical values. Polls also resulted in more frequent instalment reporting for events such as elections, as each poll could be read as an intermediate election result.

In the course of the nineteenth century, the emerging international news agencies introduced their own two "solutions" to Arrow's paradox. First, they used subscriptions, by which customers paid an advance fee for all the news reports. The price was based on the agency's past reputation in delivering reports and the guarantee that the subscriber received all the news the agency gathered, and often also was based on the subscriber's ability to pay, which could be approximated by factors such as circulation, prices or estimated profit margins. In the United States, for example, newspapers generally paid according to a complex formula, and in Britain provincial newspapers paid far lower fees than the London papers.[22] When

[22] This price discrimination was important because of the high fixed costs. Some users had a high willingness to pay, others not. With one (intermediate) price total revenue might not be enough to cover fixed costs and the service would not be provided, even though aggregate willingness to pay (the consumer surplus) could be enough for the firm to cover fixed costs. By charging different subscription fees to different users the firm was able to transform more of the consumer surplus into

subscribers had to decide whether it was worth renewing, they only had to think of the value of the few news items that had made a difference in their business, and these items probably differed from subscriber to subscriber. The subscription system made the marginal price of a news item to the customer equal to zero, and thus solved Arrow's paradox.[23]

Second, agencies bundled news in packages containing boring and exciting, relevant and irrelevant news that could differ from customer to customer. This admixture was mainly a characteristic of subscriptions, but sometimes also was achieved in other ways. A specific historical circumstance that allowed bundling, for example, was the arrival of scheduled mail steamers, such as those from Europe in the United States. Entrepreneurs such as Daniel Craig sold the news arriving from Europe first to New York merchants and then to the newspapers.[24] Knowing that they would be first to have the latest European information was enough for buyers to pay. The content did not have to be revealed before payment was agreed. Also, part of this news consisted of the numerical values of measurable properties of economic qualities that merchants knew they could use whatever its content would turn out to be. Expected new developments of existing stories probably formed a somewhat similar category. Undoubtedly, entirely unexpected news was the most valuable, but could not be sold separately. With the laying of permanent transatlantic cables in the 1860s, European news started to come in piecemeal in small, continuously arriving chunks. The opportunity to sell prime European news in a bundle disappeared.[25] A

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revenue and so could incur the high fixed costs. This standard industrial economics finding is discussed with respect to media industries in Bakker, 'Sunk Costs'.

[23] It may, however, not be optimal in efficiency terms, as the price signal can not be used to reach the most efficient allocation, and because of this absence of the price signal for individual news items users have to "overconsume" information to find the information that is most valuable for them. The present-day "information overload" may be illustrative of this suboptimal allocation mechanism. Another solution to Arrow's fundamental paradox is to make the marginal price zero by bundling it with sponsored messages, which is often used in end (consumer) markets (e.g., television advertising).

[24] For a detailed account of the races to get this information first and how and to whom it was sold see Blondheim, *News*.

[25] On a more general level the heading 'foreign news' could be used to sell news in a bundle, as the term made a promise about a bundle of news items without revealing their content. It may be no coincidence that in many early European newspapers foreign news predominated. See, for example, Starr, *Creation*, p. 32. Where the foreign news entered by ship at

similar case of ‘natural’ packaging was Reuters’ exclusive first-use contract with Austrian Lloyd’s for news and market information arriving at Trieste by ship from the East, starting in 1852.[26]

A third, regulatory, solution to Arrow’s paradox was the use of copyright to protect news. Reuters campaigned for a copyright in news throughout the British Empire, but only found success in South Africa, while the Associated Press lobbied for news copyright in the United States, obtaining a quasi-property right in news in 1918.[27] The degree to which copyright laws could create and protect intellectual property rights in news differed from country to country. A detailed study on copyright in news telegrams in Australia between 1869 and 1912, for example, shows that the balance between the interest in strong property rights and that in the free flow of news weighed more heavily toward the former in Australia and toward the latter in Britain. An important reason for this was that laws in several British colonies specifically protected copyrights in news telegrams.[28] In the United States, courts did not find quasi-property rights in “hot” news before the 1910s and copyright does not appear to have been a major issue before this time.

Fourth, ancillary services or revenue streams that exploited the news agencies’ assets, brand name, or reputation could be used to “cross-subsidize” the supply of news. Havas and Reuters, for example, introduced advertising services, whereas Wolff-Continental received financial support from the German government. In the 1890s, Reuters even started to offer a range of business and financial

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distinctive intervals, such as the post ships between Amsterdam and London and the steamers between Europe and the United States, it arrived already bundled, and newstraders could more easily control its supply.

[26] Donald Read, *The Power of News: The History of Reuters, 1849-–1989* (Oxford University Press, 1992), p. 14.

[27] Jonathan Silberstein-Loeb, “The Structure of the News Market in Britain, 1870–1914,” *Business History Review* 83 (Winter 2009), pp. 759–88. The Supreme Court ruled that information contained in news was not was not copyrightable but that the Associated Press had a quasi-property right in “hot” news. See, for example, Richard Epstein, “International News Service v Associated Press: Custom and Law as Sources of Property Rights in News,” *Virginia Law Review*, vol. 78 (1992), pp. 85–128.

[28] Peter Putnis, “The Struggle over Copyright in News Telegrams in Australia, 1869–1912,” in: Sybil Nolan ed., *When Journalism Meets History* (Melbourne, RMIT Publishing, 2003).

services, such as private telegrams, wire remittances, and eventually a bank.[29] Although meant to cushion fluctuations in news revenue, the bank eventually brought Reuters to the brink of bankruptcy.[30]

Arrow's fundamental paradox also might explain why recipients of postal letters and telegrams often did not pay a price for receiving each individual item. They would only want to pay if they would know what the message was or from whom it came, and if they did know, they often would no longer need to pay; thus the marginal price of receiving was often, but not always, set at zero.[31]

The list of business models discussed above (see Diagram 5 for an overview) is not exhaustive. Other models were used as well. In France during the nineteenth and early twentieth century, for example, it was customary for companies, and for domestic and foreign governments to pay newspapers for editorial coverage. This usually happened through various successive intermediaries. Often a firm paid an investment bank which paid another intermediary to pay the newspaper.[32] The practice did lead to some scandals, such as the campaign to sell shares in a company to invest in the building of a Panama canal in the 1880s. At the time many commentators claimed that the payments resulted in serious media bias. Yet present-day research suggests, surprisingly, that little bias in reporting can be observed, despite the widespread payments.[33]

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[29] Silberstein-Loeb, "News Market," p. 777.
[30] Ibid.
[31] Exceptions are 'collect calls' in which the receiver agrees to pay on hearing who is calling. Historically, several postal systems also had a model by which the recipient of the letter would pay, such as the US Post Office Department before 1855, when customers collected their letters at the post office: 'frequent correspondents often found themselves paying large sums for letters that they would never have bothered with had they known their contents in advance'. Richard R. John, *Spreading the News: The American postal system from Franklin to Morse* (Harvard University Press, 1995), pp. 160–1.
[32] Charles P. Kindleberger and Robert Z. Aliber, *Manias, panics and crashes: a history of financial crises* (Sixth Edition, PalgraveMacMillan 2011), 145-6; Maurice Lévy-Leboyer, *Les banques Européennes et l'industrialisation internationale dans la première moitié du XIXe siècle* (Paris, Presses Universitaires de France, 1964), 632-3.
[33] Vincent Bignon and Antonio Miscio, "Media bias in financial newspapers: evidence from early twentieth century France," *European Review of Economic History*, Vol. 14 No. 3 (December 2010), pp. 383 432. See also Vincent Bignon and Marc Flandreau, "The Economics of Badmouthing: Libel Law and the Underworld of the Financial Press in France before World War I", *Journal of Economic History*, Vol. 71 (2011), pp. 616-653.

Diagram 5. *Stylised overview of business models used by raw news traders and news agencies in Europe since the Renaissance.*

Period	Business model	Point of exclusion	Example cases	Effect
Since early Middle Ages	Reciprocity	Tit-for-tat; withholding of reciprocal news	News summary written under diplomatic letters	Effective
Since early Middle Ages	Bundling	Entire bundle or nothing	News summary under merchant's letters	Effective
Since early Middle Ages	Speed	Lateness / perishability	Horse couriers	Effective
16^{th} c. –	Selling value measurements	Revelation of actual measurement	Amsterdam, Antwerp and Italian exchange price currents	Effective
16^{th} c. –	Subscription	Entire annual output or nothing	Italian *avvisi*; A. Casteleyn, Netherlands	Effective
19^{th} c. –	Payments for news coverage	Access to editorial content	French newspapers; Wolff-Continental	Limited
19^{th} c. –	Owner pays for using medium for own benefit	Ownership of medium	French newspapers; Wolff-Continental	Limited
1840s –	Vertical integration with customer group	Membership / ownership of news agency	AP cooperative; Reuters merger with Press Ass.	Effective
1850s –	Entry deterrence / first mover advantage	Sunk committed capacity	Reuters, Havas, Wolff-Continental	Effective
1860s – 1930s	Exclusive territorial contracts	News stream of entire territory / nation state	The international news cartel	Effective
Late 19^{th} c. –	Copyright	Legal protection	Reuters' campaign; South Africa; Australia	Limited
Late 19^{th} c. –	Ancillary services	Access to other services	Reuters' adver-tising business & fin. services; Bloomberg	Limited

Notes: '16th c. --' means since the sixteenth century, and so forth. 'News stream of entire territory / nation state' means all the news originating in the territory and gathered by the relevant news agency. Havas, could, for example, withhold all the news from France and refuse to sell it to Reuters, for example, or the Austrialan Press Association, a news cooperative, could withhold all the news coming from Australia through their organisation from a foreign contracting partner such as Reuters. 'Since early Middle Ages' means at least since those times. Obviously it is likely that those models were used even earlier.
Sources: See text.

Another business model used widely in France by the customers of the news agencies, especially during the interwar period, was the buying of newspapers to influence the political and business climate to the advantage of the new owner, and therefore accepting lower commercial returns. Over time, as the quality of information declined, those newspapers would decline and sometimes disappear, but the cartel in the French newspaper market which hampered new entrants meant that these periods could be very long.[34] The major news agencies may not have been entirely immune to this business model. As noted above, Wolff-Continental, for example, received payments from the German government in the nineteenth century.

Business models: news as a toll good

In addition to the fundamental paradox, the news agencies faced a second, and related challenge—news was a quasi-public good. This economic characteristic formed the origin of the third economic tendency that affected the evolution of media industries: they made products that were nonrivalrous but excludable (Diagram 3). A product is nonrivalrous, sometimes also called nondiminishable, if one person consuming the good does not take away the quantity available to another person. One additional person 'consuming' national defence, for example, does not decrease the quantity available to others, while one additional person consuming bread does so. Pure public goods, such as national defence, are both nonrivalrous and nonexcludable and pure private goods, such as bread, are both rivalrous and excludable. In practice, rivalrousness and excludability are often a matter of degree,

[34] Vincent Bignon and Marc Flandreau, "The Price of Media Capture and the Looting of Newspapers in Interwar France," *Graduate Institute of International and Development Studies Working Paper*, No. 09 (Geneva, 2012).

and quasi-public goods can be further divided into non-excludable but rivalrous goods, called *common pool resources*, such as fishing grounds or natural water systems, and non-rivalrous but excludable goods, called *toll goods*, such as private clubs, day-care centres or theatres.[35]

Some technical inputs to the media industry, such as broadcasting spectra, could be characterised as common pool resources, but most media outputs were toll goods. Until a cinema was filled to capacity, for example, one person watching a movie did not prevent another person watching the same movie, and one person subscribing to a cable channel did not diminish the subscription opportunity to other consumers. This non-rivalrousness, combined with the possibility to exclude consumers, led to the adoption of business models that focused on the point of exclusion. Theatres, for example, could prohibit entry and thus charge ticket prices, printed and recorded media could sell physical products protected by copyright, and the early broadcasters could exclude advertisers from the airwaves and thus get their revenue from them. Stars also were able to extract rents, with superstars earning very high fees.[36]

Likewise, one additional customer receiving a news bulletin did not reduce the quantity of news available to others. Only the medium was diminishable, but news could spread through many different media.[37] Yet news was not entirely nonexcludable. News gatherers could keep news secret or use distribution technology to vary the time at which various customers obtained access to news. For example, news on a planned merger might be confined to the negotiators, the public

[35] Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (Cambridge, Cambridge University Press, 1990); Elinor Ostrom, "Beyond markets and states: polycentric governance of complex economic systems," *American Economic Review* 100 (2010), pp. 641-672.
[36] Gerben Bakker, "Stars and Stories: How Films Became Branded Products," *Enterprise and Society*, Vol. 2 No. 3 (September 2001), 461-502.
[37] Arrow, "Economic Welfare," also notes that information is indivisible: Just a small piece of it does not have a proportionate value; it often has no value at all.

being excluded until an announcement was made.[38] The emerging news agencies therefore adopted business models that focused on the point of exclusion (Diagram 5).

The toll good character posed two major business challenges to news agencies, one related to non-excludability the other to nonrivalrousness. The problem of imperfect excludability implied that in theory, a subscriber could resell or share the news with other organizations. Also, nonsubscribers to news agencies could simply take the news from subscribers' newspapers. Several solutions existed. First, contracts could prohibit such redistribution. Second, news could be sold in bulk to associations of customers such as newspapers. A third solution was that, after some time, news would become old and lose its value, and timeliness was thus a news agency's essential selling point. Fourth, on an international level, agencies could make exclusive agreements for entire territories, leaving the contract partner to organize exclusion at the national level (Diagram 5). The agencies achieved this by first agreeing on an international cartel, and then making long-term contracts with national monopolies within each agency's exclusive area.

From the 1850s to the 1930s, Reuters, Havas, and Wolff-Continental, with the acquiescence from the New York Associated Press (NYAP) and later the Associated Press as well as several smaller players, operated an international cartel, in which they divided the world into areas where each had exclusivity for news gathering. [39] These areas generally coincided with colonial and cultural spheres of influence, with competition sometimes maintained in areas that did not fall clearly

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[38] A detailed historical case study examining how the Associated Press, a non-profit cooperative owned by U.S. newspapers, developed a business model solving the quasi-public good characteristics of news is Stephen Shmanske, "News as a Public Good: Cooperative Ownership, Price Commitments, and the Success of the Associated Press," *Business History Review*, vol. 60 (1986), pp. 55-80.

[39] Jacques Wolff, 'Structure, fonctionnement et évolution du marché international des nouvelles: Les agences de presse de 1835 à 1934', *Revue Économique*, 42 (1991), pp. 575-601; Terhi Rantanen, 'Foreign Dependence and Domestic Monopoly: The European News Cartel and U.S. Associated Presses, 1861–1932', *Media History*, 12 (2006), pp. 19-35. In the nineteenth century Wolff-Continental was less fully developed and relied more on individual foreign correspondents than the other agencies.

within such a sphere.[40] The agencies saved substantial costs by obtaining the news from each other in these areas rather than building a duplicate organization. The first agreement dated from 1856 and concerned the exchange of stock market and other business data between Havas and Reuters.[41]

Often the international agencies had exchange agreements with national counterparts, which made them the sole supplier of news to and from an area. An example of the difficulty of maintaining such arrangements is the history of contracts between Reuters and the Australian newspapers. The "ideal," from Reuters' perspective, was for Australian newspapers to form their own cooperative news-gathering organization that would have a virtual monopoly on news collection for overseas sale. Such an organization would make an exclusive agreement with Reuters, in which it would only sell its news to Reuters, and Reuters would buy Australian news exclusively from this cooperative. In practice, rivalries within the Australian press made it difficult to maintain this level of cooperation despite the potential cost savings and increased revenue involved.[42]

Business models: news as a nonrivalrous good

Although the nonexcludability problem was mainly related to customers, the nonrivalrousness problem involved competitors. News had high fixed and sunk costs and low marginal costs meaning that the latter kept decreasing continuously, even if

[40] The agreements did not stop the agencies competing in areas outside the agreement. From the 1860s to the 1890s, for example, Reuters was still providing a competing service to Wolff-Continental in some German cities, using an alternative cable and telegraph line. Terhi Rantanen, *When news was new* (Chichester: Wiley-Blackwell, 2009), pp. 97–99.

[41] Read, *Reuters*.

[42] For a detailed historical discussion see Terhi Rantanen, "The Struggle for Control of Domestic News Markets (1)," in: Boyd-Barrett and Rantanen, *The globalization of news*; Peter Putnis, "Reuters in Australia: The Supply and Exchange of News, 1859–1877," *Media History*, vol. 10 (2004), pp. 67–88; —, "How the international news agency business model failed: Reuters in Australia, 1877–1895," *Media History,* vol. 12 (2006), pp. 1–17. Shmanske, "News as a Public Good," discusses how the cooperative structure of the Associated Press in the United States lowered the cost of exclusion. He also argues that cooperative rules where a commitment mechanism that prevented the Associated Press from matching discounts that any rival might offer; in the short run this might mean foregoing profits, in the long run this meant that members would not haggle about the price because they knew the Associated Press could not lower the price.

a firm's output equalled the entire market demand. In a competitive situation where prices equalled marginal costs, prices would be zero and either no firm would enter and build a news organization, or already existing organizations would go bankrupt, never to recoup their sunk costs. News agencies had considerable fixed costs, including local offices and correspondents, leases of lines. and head office costs.[43] For the Western Associated Press, the cost of telegraph transmission, paid to Western Union, was about 60 percent of all costs in the 1870s and early 1880s, after that shooting up to 70 percent and more.[44] For its successor, the Associated Press, the costs of leasing or using telegraph lines fluctuated between 48 and 68 percent of all costs between 1893 and 1913, the cost being firmly above 60 percent from 1906 onward.

The solution to the nondiminishability problem was twofold. First, there was a market solution because first mover effects existed. The marginal costs of news distribution were so low that adding a subscriber cost hardly anything. An increase in subscribers thus reduced average costs indefinitely, as fixed costs were spread over more subscribers. Once an agency had built a reputable news service and a large subscriber base, it could deter any new entrant by pricing at marginal cost because it had already incurred its sunk outlays, whereas the entrant could still decide not to sink money.[45] This explained why, after the telegraph, relatively few news agencies dominated national and international markets.

[43] Fixed costs are costs associated with inputs that cannot be varied. The organization must pay these costs regardless of the output level, even if output would be zero. The extent to which this is the case depends on the length of the period studied. Short-run fixed costs are costs that can be avoided in the longer run (such as salary costs for employment contracts with three months notice), long-run fixed costs can *not* be avoided in the longer-run (say a five-year lease contract for a telegraph line). Naturally, a fixed-cost category such as "leased wires" may consist of a bundle of contracts with varying length and of "spot" rentals, explaining the fluctuations in Fig. 1.1. Even so, this category as a whole fluctuated far less than the other categories and is consistently monotonically increasing in real dollar terms (not percentage of costs), except for the war years.
[44] Richard Allen Schwarzlose, *The American Wire Services: A Study of Their Development as a Social Institution* (University of Illinois PhD, 1965, reprinted by Arno Press, 1979), p. 251.
[45] On sunk costs see Sutton, *Technology and Market Structure*; for a discussion of the relevance of sunk costs for the history of media industries see akker, "Decline and Fall"; for a historical discussion of the problem of financing sunk costs see Bakker, "Money for Nothing."

A second solution was organizational. Given that the initial large news agencies already existed, already had incurred their sunk costs, and would not exit the market any more, they learned to live with each other and formed a cartel, preventing competition that would bring prices down to marginal costs in each agency's territory.[46] The cartel limited competition between the four and made new entry difficult, because a new entrant needed a global organization from day one, since no existing news agency would be willing to offer a contract for part of the world: The big four internationals had bound themselves in a cartel, and national news organizations generally had exclusive contracts with one of the cartel partners.[47] The global news cartel and its exclusive contracts with national counterparts thus mitigated both the excludability and the nondiminishability problem.

Although here we focus on international exclusion through collusion, at the national level exclusion was sometimes also important. In the United States, for example, the NYAP had exclusive members at the local level that could deny access to other members, allowing NYAP members to capture monopoly revenues. In 1880, for example, it served only 355 of the 971 U.S. daily newspapers.[48] It also required members to supply their news exclusively to the pool and had an advantageous agreement with the major U.S. telegraph company Western Union giving it preferential access and low rates.[49] In Britain, on the contrary, the Press Association,

[46] The absence of strong international antitrust laws, making collusion go unpunished, and probably governments' reluctance to let their news agencies merge, prevented merger or acquisition as a mechanism that would allow coordination inside one firm. Yet Reuters and Havas did form a joint service to South America, and Reuters, Havas and Wolff formed a joint venture to provide a news photo service. Silberstein-Loeb, "News markets."

[47] But note that cartel partners remained in competition in areas outside of an agreement. See, for example, Reuters business in Germany until 1898, in Rantanen, *News*, pp. 97–99.

[48] John, *Network Nation*, p. 146. The American Press Association was a news trader formed by newspapers excluded from the NYAP. Ibid., p. 147.

[49] Western Union probably hoped that this helped keep Congress from regulation the telegraph. Contracts stipulated that NYAP and its newspapers could not write unfavourably about Western Union. See John, *Network Nation*.

which consisted of mainly provincial newspapers, and had a contract with Reuters, let every newspaper in.[50]

Crises: the ups and downs of news provision

An important aspect of the news that news agencies traded, was the random appearance of calamities such as earthquakes, floods, wars, and political, economic and financial crises. Already during the Dutch tulip speculative boom and bust in the 1630s, well-developed print media disseminated information about the tulip mania as it happened.[51] Arrow's paradox discussed above implied that agencies could not easily ask a higher price at the moment a crisis appeared, even though their reporting costs were likely to go up.

Although marginal news distribution costs were extremely low, the marginal costs of news gathering were not minimal. Correspondents, reporters, and stringers were largely fixed costs, because often, depending on their contract, they needed to be paid whether there were many potential news events or not. On the other hand, eventful years with large quantities of potential news events could increase costs substantially, as more reporters and correspondents would be hired and sent away, and more telegraph line capacity needed to be rented.

The historical accounts of the Associated Press indeed suggest that wars led to increased expenditure. The cost of its foreign service shot up in 1898 during the Spanish-American War from 9 percent of all expenditure to 22 percent, reflecting a tripling of the dollar amount spent on foreign news.[52] It happened again at the

[50] Silberstein-Loeb, "News market in Britain."
[51] Robert J. Shiller, *Irrational exuberance* (New York, Broadway Books, revised version of the Second Edition, 2009), p. 85, 248; see also Peter M. Garber, *Famous first bubbles: the fundamentals of early manias* (Cambridge, Mass., MIT Press, 2000).
[52] Schwarzlose, *Wire Services*.

outbreak of World War I, when foreign service expenditure increased from 8 percent in 1913 to 14 percent in 1914, 16 percent in 1915, reaching 20 percent in 1918, the latter being more than double the 1913 dollar amount in real terms.[53]

There are several ways in which news agencies were still able to make sure they could make at least enough money from crisis news to cover their costs. One way was that in the subscription system, the annual subscription fee could reflect the reputation of the news agency, and the expectation that when crises happened, raw news would be delivered fast and effectively to the customer. The subscription in this way had somewhat of an insurance character: most of the time the subscription may not have been that essential, but the customer knew that in the times that mattered, when newspaper sales for example could boom because of crises news, the customer would get the raw news at least as fast as competitors, if not faster. Reuters emphasized this insurance aspect of subscription. The firm used to say that the boring years paid for the exciting years, because in exciting years costs would be higher while the subscriber base would not significantly change.

Another possibility was to charge a premium for crisis news—not for the first news of the impending crisis, but for the whole package of crisis news once it had started. This was difficult in practice, however, as customer contracts needed to be renegotiated then, and it could not always be foreseen when exactly a crisis would start and what could be defined as a crisis. In situations where definitions could be made easily and unambiguously, this was sometimes done. In the British market, for example, Reuters was able to levy a 50 percent war surcharge on London

[53] At the same time, real revenue decreased during the war, 20 percent in total between 1914 and 1918, and most of it—16 percent—when the United States entered the war. Ibid., p. 251.

newspapers' subscription fee from 1885. The charge would last from one month after outbreak of war to one month after cessation of hostilities.[54]

Yet even with the war surcharge Reuters did not always succeed in making sufficient profits. In 1918, for example, its profit margin was just 2.1 percent, about one third of what it had been in 1908.[55] The Associated Press' profit margin appears to have been lower most times and was probably not that dissimilar to the margins of its predecessor, the Western Associated Press, between 1867 and 1890. As both American organizations were cooperatives, low dues for members-cum-customers rather than profit maximization was the objective. Nevertheless, profit margins gave some indication of the viability of the business.

Increasing expenditure on news-gathering would not necessarily lead to larger revenues. In the long run it may have added a few subscribers, but once large agencies such as Reuters had subscribed nearly all potential customers, marginal expenditures on news gathering hardly resulted in marginal revenues. First of all, some agencies did not own the papers, so profits from increased circulation because of better news gathering went largely to newspapers. Yet, in the long run, independently owned agencies could extract part of these increased rents by increasing subscription fees, such as Reuters's war surcharge, whereas news cooperatives such as the Associated Press, where newspapers owned the news agency, internalized this incentive problem.[56] It might not be a coincidence that the Associated Press had a lower profit margin than Reuters because it had a bigger incentive to spend more on increasing quality: The Associated Press's owners also

[54] Silberstein-Loeb, 'News Market', p. 778.
[55] Reuters was restructured and reorganised during the war, with government support, among other things abandoning its disastrous foray into banking. Read, *Reuters*, pp. 83, 153, 111–31; Silberstein-Loeb, "Market for News." Using additional data to Read, Silberstein-Loeb also shows that gross margins had roughly halved between the 1860s and the 1880s, after which they fluctuated in a relatively stable band until World War I. Ibid., p. 777.
[56] The NYAP (c. 1846–1893), was organized as a partnership. The present-day Associated Press is the successor of the Western Associated Press, a rival to NYAP. On transaction costs and vertical integration see Williamson, *Economic Institutions*.

were its customers and thus would capture more of the increased marginal revenues driven by the increased quality than Reuters could. [57] The latter's merger with the Press Association may have been a logical step to align the incentives.[58]

Second, increased expenditure on news gathering did not generally lead to more potential news events happening, especially the "hard" events such as murders or wars, although if increased reporting shortened the feedback cycle, it could lead to some more news per unit of time.[59] At the same time, more potential news events happening, especially the hard events, did lead to more expenditure.[60] Increased expenditure could increase quality by transforming more of the lesser potential news events into news and by boosting variety through the offering of more human interest reports or by adding new news categories, such as sports, arts, or science.[61] Reuters, for example, set up a supplementary foreign service in 1890 that focused more on human interest, features, and background stories to supplement the hard news. It was jointly funded by Reuters and the Press Association, the latter sharing in the costs and thus reducing Reuter's profit fluctuations.[62]

Besides vertical integration with the customers, war surcharges, and a subscription fee high enough to cover unforeseen crisis reporting, , there appear to have been few other means by which news agencies were able to recover higher reporting costs during crises. During wars governments alleviated some of the costs by providing items such as transport, protection, food and lodging in natura. During

[57] Obviously, many other factors were likely to have contributed to the difference in profit margins. The importance of the ability to capture marginal revenues for media organizations is further explored in Bakker, "Music Multinational", and in Bakker, 'Rights-Based Model". Williamson, *Economic Institutions,* and Roberts, *The Modern Firm* provide theories to explain why activities are done within or without an organization.
[58] See "Organisational structure of the international news agencies."
[59] One could argue that a potential news event became news once it was reported. If it went unreported and unrecorded, obviously it was not transformed into news. For a general discussion of the nature of news see Robert E. Park, "News as a form of knowledge: a chapter in the sociology of knowledge," *American Journal of Sociology*, vol. 45 No. 5 (March 1940), pp. 669–86.
[60] We abstract here from the secular acceleration in news events per time interval through increasing uniformity and decreasing response times brought about by the telegraph. See the next section.
[61] See above.
[62] Silberstein-Loeb, "News market in Britain," p. 779.

financial crises, more firms might want to have a real time subscription to raw business news, but at the same time some customers went bankrupt. Likewise, many newspaper customers experienced lower advertising revenues and thus had a lower willingness to pay. In the Netherlands, for example, the crisis of the 1930s forced the existing news agencies into one merged organisation, a national exclusive cooperative with most newspapers in the country as members.

All the business data discussed above and tabulated in Diagram 4 obtained extra relevance during crises. Present-day studies in finance generally find that news affect the movement of financial markets. The size of the effect that studies find differs substantially. It also remains the question to what extent media reporting produces feedback effects, or self-reinforcing herd behaviour. Some authors, such as Robert Shiller, argue that there is a substantial effect of the media in instigating bubbles, while other authors find the obverse.[63] Campbell, Turner and Walker, for example, find that press coverage did not feed the British railway mania in the 1840s, and Battacharya et al., find that media reporting played only a very limited role in the internet bubble of the 1990s.[64]

During financial crises, everyone wanted to know the latest information about goods prices, quantities, exchange rates, credit rating, interest rates, share prices, election results, and battle outcomes, as well as the results of opinion surveys such as those on consumer and business confidence. Longitudinal studies for the twentieth century show that during crises, the financial markets were far more sensitive to media reports, both reports containing new information and more

[63] Shiller, *Irrational exuberance*, pp. 85-105.
[64] Gareth Campbell, John D. Turner and Clive B. Walker, "The role of the media in a bubble," *Explorations in Economic History*, Vol. 49 (2012), pp. 461-481; Utpal Bhattacharya, Neal Galpin, Rina Ray and Xiaoyun Yu, "The Role of the Media in the Internet IPO Bubble," *Journal of Financial and Quantitative Analysis*, Vol. 44, No. 3, June 2009, pp. 657–682.

'persuasive' reports that served only to increase exposure of a particular stock.[65] This suggests that customers, especially corporate customers, may also have had a higher willingness to pay during crises.

Yet the news agencies had little ability to transform this willingness to pay into higher revenues. In theory, they could increase the subscription fee for corporate subscriptions during crises, but in practice this was often not feasible. The infrastructure companies, such as the telegraph and telephone companies, probably made more money from financial crises, wars, and other calamities.[66] Especially in the late nineteenth century when telegraph capacity was quite scarce, news agencies spent far more on leasing costs during crises.

The raw material that the news agencies transformed into sellable news bulletins was not the news, but the entire universe of all events that happened at a given time. The news agencies *selected* the events they *judged* as news, and then they further added value by *writing accurate reports* about these events and *combining various disparate facts into one coherent report*. So the selection of what was news could be compared to gold mining: sifting through an enormous amount of rubbish and then keeping the few gold nuggets. The writing of reports was then combining some gold nuggets, reporting accurately on them and as fast as one could, and then selling them to customers across in the world. In short, subscribers paid news agencies for various quality dimensions: judgement, selection, accurate reports, speed, coherent reports, and unbiased reports. During crises most of these quality dimensions became more relevant.

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[65] Paul C. Tetlock, "Giving content to investor sentiment: the role of media in the stock market," *Journal of Finance*, Vol. 62 (2007), pp. 1139-1168; Diego Garcia, "Sentiment during recessions," *Journal of Finance*, Vol. 68 No. 3 (June 2013), pp. 1267-1300. Joseph E. Engelberg and Christopher A. Parsons, "The Causal Impact of Media in Financial Markets," *Journal of Finance*, Vol. 66 No. 1 (February 2011), pp. 67-97, examining regional news find also that stock price movements are very sensitive to the reporting and publishing of new information.

[66] Dwayne Winseck, "Double-edged swords: communications media and the global financial crisis of 1873," in: Peter Putnis, Chandrika Kaul and Juergen Wilke eds., *Communication, News and Globlisation: Historical Studies* (Hampton Press / International Association of Media and Communication Research, 2011), pp. 55-82.

As calamities unfolded surprising events happened in rapid succession. After a financial crisis broke, the key thing people started to expect was the unexpected. They became habituated to surprising events that continued to happen and stopped trusting other expectations. Keynes already noted this in his General Theory when he discussed animal spirits: once a crisis was in progress, businessmen expected so many surprises that they held back investments, and were not prepared to make the jump into uncertainty they normally made when they green-lighted new investments. The only thing they felt sure about was that surprising things would continue to happen.[67]

Crises can be divided into various different crises: natural disasters such as earth quakes or floods; financial and economic crises; wars; famines (Diagram 6). Of these calamities, wars and natural disasters were probably the most costly to report, since reporters needed to be at far-away and often dangerous locations. Telegraph lines needed to be leased, travel tickets booked and additional correspondents hired. The cases of Reuters and AP discussed above show that these cost increases were large and significant. Financial crises, on the contrary, happened usually in known places such as financial and political capitals, where reporters and a whole reporting infrastructure were already present, making these crises far easier and less costly to report. Business customers' willingness to pay might have been exceptionally high for financial news. What they actually needed to pay was probably exceptionally low in comparison.

It appears that the willingness of customers to pay might also have been high in the case of political crises, partially because the outcome of political crises could

[67] John Maynard Keynes, *The General Theory of Employment, Interest and Money* (Palgrave MacMillan, 2007; orig. edn. 1936).

Diagram 6. *Informal overview of cost and quality dimensions of news reporting in several types of crisis situations*.

Reporting aspect	Natural disasters and accidents	Famines	Wars	Financial and economic crises	Political crises	Elections
Reporting costs	High	Intermediate	High	Low	Low	Intermediate
Feedback effects caused by news transmission	Low	Low	Low	High	High	High
Customers' average willingness-to-pay	Lower	Lower	Intermediate	High	High	Intermediate
Degree of surprise	High	Intermediate	Intermediate	High	Intermediate	Intermediate
Duration	Short	Intermediate	Long	Long	Long	Short
Value of speed	Intermediate	Low	High	High	High	Intermediate
Value of accuracy	Intermediate	Low	High	High	High	High
Consequences of reporting errors	Intermediate	Intermediate	High	High	Intermediate	High
Salaries of journalists	Intermediate	Intermediate	High	High	Intermediate	Intermediate

Source: informal judgement based on the historical literature discussed in this paper.

have a big effect on the business and financial world. In terms of duration, financial crises lasted longer than many other crises.

The value of speed and accuracy was probably highest in wars, financial crises and political crises (Diagram 6). The consequences of reporting errors were probably most serious in wars, financial crises, and in elections—the latter partially because of self-feedback mechanisms. In addition, salaries for war correspondents and financial journalists were probably among the highest for news journalists.

In the long run, news providers made money from crises and from financial crises in particular because the possibility of crises meant that many customers kept subscribing to the service at substantial fees in quiet times. And individual crises might eventually lead to more circulation and therefore higher advertising rates for customers. If crises knocked out a few smaller media firms then the survivors could profit. If competition declined, they could transform some of the consumer surplus into corporate profits. During severe economic crises in which many newspaper shut down or merge, the iconic outlets that survived might have got into better shape because customers flocked to the old trusted names and some competitors had disappeared.

New business models

One way in which news providers were *not* able to capture the benefit or the rents of the services they provided, was through the analysis of large databanks full of news articles by hedge funds and other financial firms. Academics studies abound about relations between news reporting and movements in the market, and undoubtedly many financial firms do their own research using large news databanks. They can test relations between news pieces and the movements of the financial market, at macro, meso, and micro levels. Though news providers get some money from the use of databanks, it remains a question whether they just get a very small part of the rents / profits that others generate from the large aggregate of the information that they create.

Iconic news providers such as the *New York Times*, the *Wall Street Journal*, the *Financial Times*, Reuters, AP and AFP would each on their be able to thwart a data-mining exercise by withholding their content, and so in theory should be able to capture some of the rents of the data-mining exercise. In practice, however, if individual subscriber has access to a publication's entire archive, this will be difficult. If they would ever be able to capture some of the profits that others generate from their information, the iconic providers at least could make big money.

Maybe it is news providers' curse they can make so little money from crises. Their customers, especially the corporate customers such as investment banks and hedge funds can make large profits with the reliable teal-time data, and with massive number crunching on the universe of all past news stories, yet it seems that the news providers themselves have very little means to capture a lot of the rents that those customers are generating.

In the nineteenth century, when, besides merchants, firms, trading exchanges and government departments, the major customers were newspapers, many news agencies solved this problem by vertical integration. However, it is difficult to see whether and how the vertical integration of financial news with investment banks and hedge funds could work. Presumably if we use the AP model, this would involve banks becoming members of a news cooperative and so paying for the news, but at the same time they would also be major subjects in the news that the agency would provide, thus creating a conflict of interest. A long similar lines of reasoning it seems unwise to have financial firms owning news agencies.

The only chance of rent capture may be to charge special access fees for database access and limit it to per-calculation access, in which the customer does not get copies of the news stories database, but can only send in an algorithm that the news organisation will run for them on the news database, which they keep in-house. Access fees for social scientists and governments, could also be levied, and this is already happening to some extent. Yet, since the latter activities may not generate a lot of profit, there may not be a lot of rent to be captured here. What kind of business model the news agencies will come up with next is an inspiring question that makes one look full of wonder and excitement to the times that lie before us. The answer will define the role of news in the other financial crises in the twenty-first century.

Conclusion

This paper examined how we got to a situation where a few firms dominated the international market for raw news, why within countries national news supplies were dominated by a few firms, how these agencies have been able to make money from news, and what business models they developed to this end. We also examined how these business models interacted with market structure, and if and how the business models held their ground during the ups and downs of news supply, such as financial crises and other calamities.

We gave a brief overview of the news trade since the Renaissance and noted how four general economic tendencies that affect the evolution of media industries affected the evolution of news networks: how sunk costs led to a quality race, leading to a handful of news agencies dominating the international news trade after the 1850s; how the fact that marginal revenues equalled marginal profits stimulated vertical integration, as, for example, expressed in the many news cooperatives across the world and the Press Association's acquisition of Reuters; how the toll good character of news led to business models focused on ways to exclude customers so a fee could be asked; and, finally, how the project-based character of news gathering led to agglomeration and co-location of news traders with other media industries.

The key problem news traders faced was how to overcome Arrow's fundamental paradox. To sell news, they needed to reveal the content, and when they revealed the content they had already given it away. We reviewed the solutions that firms devised for this, which involved business models focused on trading the quantitative values of economic properties that could be stated in advance such as prices, quantities, exchange rates and interest rates; on subscriptions, through which the marginal price of a news item to the buyer became zero; on bundling of news items; on speed; on exclusive territorial contracts; on deterring entry by forming a news cartel; and, finally, on inviting money from firms about which reports were written, as happened in France during the nineteenth century.

Given the fundamental paradox, it was difficult for news agencies to profit from crises. They could not ask higher prices for individual news items during a crises, and the possibilities for raising subscription fees or increasing the number of subscriptions were limited. Yet financial crises were what probably made a large part of business customers willing to pay the subscription fees, knowing that even if the service's value was lower than the fee during good times, during crises its value would be enormous.

We also noted how nowadays news agencies only to a very limited extent can capture some of the revenue that firms like banks and hedge funds extract from large databanks of historical news messages. The development of any business models that would allow news agencies to capture more of this revenue might have profound implications for the financial viability of news agencies.

In their quest to be able to ask money for news, news agencies developed models that made them less sensitive to crises, less sensitive to selling any individual piece of news, and therefore made their business models more crisis-resistant. The flip side was that because of these same models they could not easily make money from crisis news by selling at higher prices, and many crises, such as wars and natural disasters, actually cost them much more to report. Financial crises were less costly to report than most other calamities. Relative to other crises, the news agencies probably lost less money on financial crises in the short run. In the long run, crises formed their lifeblood. They may not have been able to make particular moneys from particular crises, but they existed because crises happened. No crises, no news agencies.

News agencies may not have been able to make particular moneys from particular calamities, but in the long run the crises justified the existence of the agencies to the customers. No crises, no news agencies. When frequent financial crises started to become a trademark for the emerging world economy, the news agencies helped to report them, and helped to link crises in particular countries to the rest of the world. In this way news agencies shaped the emergence of the modern world economy as we know it today.

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