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Relationship Data: The Missing Link of the Current Financial Infrastructure¹

By Irina S. Leonova and Nigel Jenkinson

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Abstract

Improving understanding of the complex relationships among financial entities is critically important for risk managers and for financial authorities charged with multiple policy objectives. High-quality information is lacking at both the intra- and inter-enterprise levels and to support analysis of the financial network. Put simply, the current quality and quantity of relationship data are not sufficient to deliver on the ultimate objectives. For the purpose of this discussion we use a very generic definition of a term relationship somewhat similar to the definition used to describe human relationships. And like in the human relationships case, we will not claim that only marriage and blood connection makes your relatives, but also loaning a book, loving, hating and sharing a flat. In the financial context, the relationships may be determined by accounting rules set, for example, by IFRS or US GAAP, as well as regulatory requirements in areas of risk management, market integrity, know-your-client, network analysis and statistical consolidation. The financial industry and regulators have spent countless hours arguing and debating the definition of ownership. The problem lies in the question itself. We suggest that as part of any relationship data system the best approach is to put the question aside and avoid a conceptual and practical quagmire. Rather, we recommend collecting and storing less-subjective granular data on the actual legal and economic relationships between firms, which provides a flexible framework from which any user can answer the question on corporate relationships he or she determines is appropriate at a given time. Encouragingly, technological solutions are available to accommodate this multiplicity of requirements in a single solution. The paper outlines where the practical challenges are that inhibit the development of high-quality relationship data and how they can be overcome.

1. Introduction

Improving understanding of the complex relationships among financial entities is critically important for risk managers and for financial authorities charged with multiple policy objectives. High-quality information is lacking at both the intra- and inter-enterprise levels and to support analysis of the financial network. Put simply, the current quality and quantity of relationship data are not sufficient to deliver on the ultimate objectives.

The financial industry and regulators have spent countless hours arguing and debating the definition of ownership. The problem lies in the question itself. We suggest that as part of any relationship data system the best approach is to put the question aside and avoid a conceptual and practical quagmire. Rather, we recommend collecting and storing less-subjective data on the actual legal and economic relationships between firms, which provides a flexible framework from which any user can answer the

¹ This article represents the personal views of the authors and does not represent the views of the Financial Stability Board.

question on corporate relationships he or she determines is appropriate at a given time.

Indeed, the greatest difficulties in creating relationships or corporate hierarchies are based on trying to define what is actually meant by “ownership.” In our view, the problems stem from trying to force a definition of ownership, when in fact different definitions may be applicable under different circumstances to address different policy questions. That leads to a fundamental question of whether there is a reason of why any relationship data structure needs to be driven by the concept of “an ultimate parent, responsible for a family of children and grandchildren.” Instead, why not simply store numerical data about the actual relationships between firms from which different types of hierarchies can be defined “on-the-fly” according to whatever criteria a user decides is relevant. For example, a relationship structure might store the fact that company A owns 30 percent of the common stock of company B, 75 percent of its voting rights, and guarantees all of its credit. Does that mean company A “owns” company B? The ownership data structure does not care and does not know—that is up to the individual user who accesses the data to decide. If, for a given policy analysis, the user wants to define ownership based on 51 percent or more of the equity, then in that instance the hierarchy would not show company A as owning company B. But if a credit officer assessing credit exposures wants to define ownership as any firm that guarantees the credit of another company, then the hierarchy would show company A as owning company B.

The paper outlines where the practical challenges are that inhibit the development of the relationship data and how they can be overcome. In Section 2, we describe relationship data, and set out the objectives and requirements for such information by financial policymakers. Section 3 describes the currently available technological capabilities to model relationship data, while Section 4 outlines why flexible relationship data models are the approach of the future. The transition from flat to flexible relationship data and immediate short-term priorities are outlined in Sections 5 and 6.

2. Relationship Data—What It Is and What It Is Not

For the purpose of this discussion we take a very generic definition of the term “financial relationship,” somewhat similar to the definition used to describe human relationships. And as for human relationships, financial relationships come in many shapes and sizes. We will claim that not only marriage and blood connections define your relationships, but also loaning a book, loving, hating and sharing a flat.

a. Accounting Concepts²

A key concept for financial accountants is the exercise of “control.” As outlined further below, a critical element of accounting concepts is determination of the ability to exercise control, which may significantly impact the treatment of relationships. The traditional view of control from the financial accounting standpoint generally

² Discussion in this section is based on a number of accounting analysis reviews including Baker, Christensen and Cottrell, *Advanced Financial Accounting*; Deloitte Touche Tohmatsu, “Business Combinations and Changes in Ownership Interests”; Ernst & Young, “US GAAP versus IFRS,” November 2013; PKF International, “Are You Ready for IFRS?”

separates the concept into direct control and indirect control. At the simplest level, direct control is present when one company owns a majority of another company's common stock. Indirect control is defined as the ownership by one company of common stock owned by one or more other companies that are all under common control. Thus, if company A owns 75 percent of the common stock of company B, which in turn owns 75 percent of the common stock of company C, then company A indirectly controls the activities of company C.

While there are other national applications of accounting rules, for the purpose of this discussion we will discuss in more detail the concepts of relationship data within the framework of the International Financial Reporting Standards (IFRS) as promulgated by the International Accounting Standards Board (IASB) and U.S. Generally Accepted Accounting Principles (U.S. GAAP) promulgated by the U.S. Financial Accounting Standards Board.

As noted above, the concept of control is prominent in the application of accounting consolidation rules. While there is significant convergence in IFRS and U.S. GAAP accounting frameworks, there are differences in how control is defined under these two approaches.

US GAAP provides two approaches to evaluate control: variable interest model and voting model. The variable interest model evaluates control based on determination of which party has power and benefits. The voting model evaluates control based on existing voting rights.³

Regardless, normally control would be based on the majority ownership of voting shares. Over the years, FASB has been trying to move toward an accounting consolidation requirement utilizing "effective" control, defined as an ability to direct the policies of another entity even though majority ownership could be lacking. In this context, it is important to be familiar with the terms "variable interest entity" (VIE) and "special purpose entities" (SPE) as the next step in determination of control under U.S. GAAP is the evaluation of the VIE rule.

A VIE is a legal structure used for business purposes, usually a corporation, trust or partnership, that either does not have equity investors that have voting rights and share in all profits and losses of the entity, or has equity investors that do not provide sufficient financial resources to support the entity's activities. An SPE is a corporation, trust or partnership created for a single specified purpose. It usually will not have substantive operations and is used for financial purposes. SPEs were extensively used by Enron prior to its collapse. As a result of Enron and other similar scandals related to SPEs, the FASB issued FIN46 (an interpretation of ARB 51) and later FIN46R that defines a variable interest in a VIE as a contractual, ownership (with or without voting rights), or other money-related interest in an entity that changes with changes in the fair value of the entity's net assets exclusive of variable interest. The focus of FIN46R was to capture investment relationships in which a controlling financial interest is not indicated by voting rights, but is indicated by residual interest in risks and benefits.⁴ It should be noted that the U.S. GAAP

³ Ernst & Young, "US GAAP versus IFRS," November 2013.

⁴ Baker, Christensen and Cottrell, *Advanced Financial Accounting*.

definition of VIE encompasses SPEs and other entities falling within its conditions. As can be seen, the emphasis of assessment of a VIE relationship is a review of contractual arrangements and their results. Contractual arrangements can be represented by options leases, guarantees of asset recovery values or guarantees of debt repayment. By definition, there can be only one primary beneficiary for a VIE, which is required to consolidate the VIE within its accounts. The primary beneficiary must meet the following conditions: It would absorb a majority (more than 50 percent) of the VIE's expected loss and/or would receive a majority (more than 50 percent) of the VIE's expected residual returns.⁵

US GAAP does not consider the notion of “de facto” control and does not consider potential voting rights in the evaluation.

IFRS in its determination of control normally relies on the majority ownership of voting shares. However it also considers convertible instruments and other contractual rights that could affect control. For example, a parent with less than 50 percent of the voting shares could exercise control through contractual arrangements that allow control of the votes of the Board of Directors. Control over SPEs is determined based on judgment and relevant facts. Substance over form is considered in determining whether an SPE should be consolidated for accounting purposes.

IAS 27 provides guidance about control, which is defined as the power to govern the financial and operating policies of an entity so as to obtain benefits from its activities. Control is generally presumed to exist when the parent owns, directly or indirectly through subsidiaries, more than half of the voting power of an entity. However, the provisions exist to demonstrate that ownership does not constitute control, although this is much more of an exception condition rather than a rule.⁶

IAS 27 provides four conditions where control exists when the parent owns half or less of the voting power of an entity: (a) power over more than half of the voting rights by virtue of an agreement with other investors; (b) power to govern the financial and operating policies of the entity under a statute or an agreement; (c) power to appoint or remove the majority of the members of the board of directors or equivalent governing body and control of the entity is by that board or body; or (d) power to cast the majority of votes at meetings of the board of directors or equivalent governing body and control of the entity is by that board or body. Where IFRS differs from U.S. GAAP is that it considers potential voting rights. An entity may own instruments (for example, share warrants, share call options, convertible debt or equity instruments) that have the potential to give the entity voting power or reduce another party's voting power over the financial and operating policies of another entity.

The Standards Interpretation Committee release SIC-12 Consolidation—Special Purpose Entities⁷ outlines the circumstance where indicative control may exist: (a) the

⁵ Deloitte Touche Tohmatsu, “Consolidation of Variable Interest Entities: A Roadmap to Applying the Variable Interest Entities Consolidation Model.”

⁶ Ernst & Young, “US GAAP versus IFRS,” November 2013.

⁷ Subsequently endorsed by the IASB.

activities of the acquiree are conducted on behalf of the entity according to its specific business needs so that the entity obtains benefits from the acquiree's operations; (b) the entity has the decision-making powers to obtain the majority of benefits or has delegated those powers through an "autopilot" mechanism; (c) the entity has rights to obtain the majority of benefits and, therefore, may be exposed to risks from the acquiree's activities; or (d) the entity retains the majority of residual or ownership risks related to the acquiree or its assets in order to obtain benefits from its activities.⁸

b. Regulatory Approaches to Relationship Data

Understanding the complex and dynamic web of relationships within the financial sector poses multiple challenges to authorities responsible for various public policy goals. Interests differ according to the regulatory objectives. Prudential authorities are primarily focused on the safety and soundness of individual firms and place particular attention on the ability of risk managers to pull together a comprehensive picture of the risks faced by financial institutions and to manage these risks effectively within and across the institution as a whole. Market supervisors focus on the integrity of markets and on the relationships between market participants, to avoid collusion and cartels and the manipulation of prices and conditions. Resolution authorities support the introduction and implementation of practical recovery and resolution plans for financial firms that often have complex internal organizational structures and interconnections with other institutions. And more broadly, financial stability authorities have responsibility to ensure the safety and soundness of the financial system as a whole, and thus focus on the identification and containment of system-wide risks and on the robustness and resilience of the financial network in the event of major adverse shocks such as a severe market disturbance, sharp macroeconomic downturn or the failure of a major firm. To accomplish those various objectives, financial authorities have consequently introduced a number of approaches to relationship data.

i. Risk Management

There are a number of dimensions to ensuring that risks are actively managed in individual firms and at the system-wide level, which depend on a clear and effective model of relationship data. The following four-way categorization can be used to describe the dimensions, although others are possible:

1. Firm level—Are risks aggregated together effectively across the firm as a whole, to provide a comprehensive picture of the risks it must manage? Can such aggregation capabilities also support a focus on risks faced by material business units or key entities within the group? Does it have an appropriate risk management system, management controls and buffers?
2. Counterparty level—Does the firm have a comprehensive understanding of its exposures, relationships and interconnections to individual counterparties that in many cases are themselves organized in highly complex ways?

⁸ Ernst & Young, "US GAAP versus IFRS," November 2013.

3. System level—Do the authorities have effective techniques to monitor the emergence of system-wide risks, taking into account the complex interconnections and dependencies across the system, and tools to address them?
4. National level—Recognizing the strong integration of global capital markets, combined with national regulatory responsibilities and legal systems, do national authorities have a good understanding of the risks to the domestic financial system, taking into account global financial developments and risks, and the powerful spillovers and interconnections across borders?

Expanding on each element in turn:

Firm-level risks: Many large financial institutions have very complex organizational and legal structures sometimes as a result of merger and acquisition activities, sometimes as a result of tax planning or other considerations. For example, recent research by the Federal Reserve Bank of New York show that the largest U.S. bank holding company controls over 3,000 separate subsidiaries. That is based on the definition of supervisory control applied for supervisory consolidation purposes, which differs from accounting consolidation.⁹ Financial supervision is typically organized on functional lines. Thus, within a complex financial group, supervision typically focuses on “banking risks” separately from “insurance” risks, etc. So, for example, banking supervisors review the risk management capabilities of the banking element of the financial conglomerate. Does management have effective systems for pooling together the risk picture across all banking entities? Does the banking “subgroup” meet regulatory standards and principles, as embodied in national regulations?¹⁰ And reflecting the different nature of insurance risks, insurance supervisors focus on the insurance entities within the financial group, and assess aggregate insurance risks against the appropriate standards.

A current focus of supervisory authorities is to ensure that complex firms understand and control the risks to the firm as a whole effectively, and are not blindsided by large risks being run by individual entities within the group (for example, AIG financial products), or by a build-up of a concentrated risk position by individual entities within the group each taking the same exposure. As a key component of this work, in early 2013, the Basel Committee published a set of principles for effective risk data aggregation and risk reporting, noting that:

One of the most significant lessons learned from the global financial crisis that began in 2007 was that banks’ information technology (IT) and data architectures were inadequate to support the broad management of financial risks. Many banks lacked the ability to aggregate risk exposures and identify concentrations quickly and accurately at the bank group level, across business lines and between legal entities. Some banks were unable to manage their risks properly because of weak risk data aggregation capabilities and risk

⁹ U.S. GAAP determines that control has been established if the parent owns more than 50 percent of the voting stock of the firm, while for supervisory purposes, this limit is only 25 percent.

¹⁰ Which in many cases reflect the national implementation of internationally agreed standards such as Basel III.

reporting practices. This had severe consequences to the banks themselves and to the stability of the financial system as a whole.

The Basel Committee and the FSB expect global systemically important banks to comply with the principles by Jan. 1, 2016.¹¹ To ensure that large internationally active financial conglomerates are managed and supervised appropriately and that risks do not fall between the cracks, the Joint Forum of financial regulators (which brings together banking regulators (BCBS), insurance supervisors (IAIS) and market regulators (IOSCO)) has set out Principles for the Supervision of Financial Conglomerates, which aim to “close regulatory gaps, eliminate supervisory ‘blind-spots,’ and ensure effective supervision of risks arising from unregulated financial activities and groups.”¹² The principles place particular importance on taking account of unregulated entities, including, as relevant: operating and non-operating holding companies; unregulated parent companies and subsidiaries; and SPEs. In the assessment of risks from unregulated entities, moreover, the principles also set out the importance of taking a wide view of the following characteristics, and their influence on the regulated sector: (direct or indirect) participation, influence and/or other contractual obligations; interconnectedness; risk exposure; risk concentration; risk transfer; risk management; intra-group transactions and exposures; strategic risk; and reputation risk. Many of these elements highlight different facets of risk relationships within large complex financial firms.

As noted above, it is important that firms and financial authorities have a good understanding of the internal relationships and associated risks at different levels within the firm, as well as at the aggregate group level. An important element of the supervision of financial conglomerates is that there are clear processes in place to confirm the roles and responsibilities of each supervisor and effective coordination mechanisms to identify a group supervisor and support comprehensive group-level supervision. The Joint Forum principles note that a particular focus should be placed to ensure that supervisory standards take account of risks that are heightened for financial conglomerates given the internal relationships and structures, including double gearing, contagion risk, concentration risk, conflicts of interest, and intra-group exposures.

Intra-group linkages and structures are particularly important in developing effective recovery and resolution plans. For example, can firms and resolution authorities clearly identify any “core functions” or services provided by a particular firm within the financial system that should ideally be preserved under resolution? Can particular parts of the firm be readily sold or alternatively closed down? Do legal and contractual relationships within firms (such as intra-group guarantees and cross-default clauses) support or inhibit the separation of particular functions or legal entities (also bearing in mind informal links such as reputational risks)? Do information systems provide sufficient, high-quality, timely information in a flexible manner to support crisis planning and resolution? As set out in the FSB Key Attributes of Effective Resolution Regimes for Financial Institutions, can firms undertake a mapping of essential functions and systemically important functions and corporate structures?¹³ And do information systems enable the firm to construct a

¹¹ The principles also highlight that application should be affected by a bank’s group structure.

¹² Joint Forum, “Principles for the Supervision of Financial Conglomerates,” September 2012.

¹³ FSB, “Key Attributes of Effective Resolution Regimes for Financial Institutions,” October 2011.

complete and accurate view of its aggregate risk profile under rapidly changing conditions, including the provision of essential information on intra-group inter-linkages?

All the above considerations highlight adaptability as one of the key elements of relationship data information systems—for example, Principle 6 of the BCBS data aggregation report notes the importance of a flexible system to meet new requirements and requests, in the explanation emphasizing that “a bank’s risk data aggregation capabilities should be flexible and adaptable to meet ad hoc data requests, as needed, and to assess emerging risks.” A review of progress in implementing the principles at the end of 2013 revealed that adaptability was one of the lowest-rated principles, and that considerable further progress was required to support full compliance by financial participants.

Counterparty level: An important element of any risk management system is the management of counterparty risks. What would be the impact of a failure of a major counterparty? How can such risks be contained and managed? Given the complexity of financial groups, a particular challenge for risk managers is to build and maintain an aggregate picture of risks to individual counterparties. For example, are entity A and entity B both members of financial group Y? Given fluid structures comprising several thousand entities this is no mean challenge. And of course any risk management assessment by complex firm X of risks to financial group Y must take account of a potentially wide range of relationships and exposures, for example through lending and funding markets, derivatives contracts, guarantees, and collective investments and securitizations, and take account of risk mitigants such as collateral and credit protection.

The Basel Committee has recently published a Supervisory Framework for Measuring and Controlling Large Exposures—highlighting another challenge from the crisis:

One of the key lessons from the financial crisis is that banks did not always consistently measure, aggregate and control exposures to single counterparties across their books and exposures.

A critical area in the Basel Committee work is the identification of “connected counterparties”—where a bank may have exposures to a group of counterparties with mutual relationships or dependencies that imply that they are likely to fail simultaneously. The committee notes that “*one of the main challenges in managing and controlling large exposure is the identification of groups of connected counterparties.*” Relationships of “control” and “economic interdependence” may each alone provide sufficient grounds for establishing connections among counterparties. Various elements should be taken into account to assess connectedness through control, including: voting rights and agreements; rights of influence through appointment and dismissal provisions; rights of influence over management decisions (for example, through contracts or otherwise); and accounting criteria. Economic interdependence takes into account factors such as: the proportion of revenues and expenditures; guarantees; proportions of production; sources of repayment; spillover risks from one counterparty to another; funding dependencies; and contagion risks from default of one counterparty to another. The committee proposes that risks to

connected counterparties should be included as a single risk in relation to large exposure limits.

System-level risks: Financial stability authorities have responsibility for mitigating risks to the financial system as a whole, to ensure that the system is robust and resilient in the face of adverse shocks, and so can continue to provide key financial services to support the real economy. A healthy, stable financial system is an essential prerequisite of a well-functioning market economy.

The recent financial crisis drummed home the importance of improving the monitoring of system-wide risks and of developing macro-prudential policy frameworks and tools that mitigate and contain them. System-wide risks have both a time-series dimension, in part reflecting the inherent pro-cyclicality of the financial system, and a cross-section dimension that focuses on the resilience of the system to a shock at any moment in time, such as the failure of a major firm.

In the latter context, a key priority for financial stability authorities is to develop a better understanding of the interconnections and relationships among financial firms and of the robustness of the financial system under conditions of financial stress. High-quality information is needed on the exposures and interdependencies among financial firms, to develop better models of the resilience of the financial network to disruption. Are interconnections among firms rising, increasing the risk of contagious failures and system collapse, if the system is pushed over a “tipping point”?¹⁴ Are some firms particularly central to the financial system in terms of the potential impact of their failure?¹⁵

Many authors have noted the information and data challenges to support the development of improved models of financial networks and of their potential behavior under stress.¹⁶ One key component is the clear identification of parties to financial transactions and of corporate structures and relationships. As a foundational building block to support multiple objectives, the Global Legal Entity Identifier System has recently been launched to provide a unique, common entity identification system for parties to financial transactions.¹⁷ And a supervisory data system has recently been introduced that provides confidential information on the largest individual exposures of global systemically important banks on a consistent basis to support the identification of risk concentrations and network links (as the largest exposures are often to other global systemically important links).

In undertaking such system-wide analysis, it is of course vital to take account of “indirect” connections as well as direct links. Are firms increasing their exposures in common to particular risks such as real estate, leading to growing system-wide risk concentrations? Are firms taking appropriate account of behavioral effects and externalities such as fire sales under stress, or a sudden withdrawal of market liquidity as firms try to unwind crowded trades at the same time? How will funding markets

¹⁴ Haldane (2009); Chan-Lau (2010).

¹⁵ For example, Adrian and Brunnermeier, “CoVar” (2011) and Basel Committee, “Global Systemically Important Banks: Updated Assessment Methodology and the Higher Loss Absorbency Requirement,” (2013); Georg and Minoiu (2014).

¹⁶ Bier (2009); Farmer et al. (2012); Jenkinson and Leonova (2013).

¹⁷ FSB, “A Global Legal Entity Identifier for Financial Markets,” June 2012.

perform under market stress? Developing understanding of the possible indirect relationships between financial firms is an important extension of the work on direct connections.

Financial system policy design must take account of system interconnections and risks to the financial network. For example, as part of the policy framework to address the “too big to fail” problem, global systemically important banks and globally systemically important insurance companies must maintain a capital supplement or surcharge depending on an assessment of their systemic importance. Assessments of interconnectedness and complexity form an important part of the calibration of systemic importance. Moreover, to contain system interconnectedness and spillover risks, the Basel Committee large exposure limits incorporate lower thresholds on exposures to and between global systemically important banks.

An important element of the work of financial stability authorities is to ensure that the financial system continues to provide core financial services, such as clearing, settlement and payments. That entails a detailed focus on system design and robustness of the individual subsystems. In many cases these arise because of interconnectedness risks. Policy solutions have been to lower such interconnection risks through infrastructural developments such as introduction of Real Time Gross Settlement Payment Systems, CLS in foreign exchange markets, and CCPs in financial markets. Ensuring that the financial infrastructure is itself robust given the concentration of risk is an important focus of the work of financial stability authorities.

National system risks: Financial authorities wrestle continuously with the challenge of preserving the manifold benefits of an open, global integrated financial system while responsibilities for the supervision, regulation and stability of the “domestic” system remain at the national level.¹⁸

At the domestic level, that entails collecting information on risks, relationships and interconnections at the national level, to develop a picture of “domestic” financial stability risks, while also focusing extensively on the interconnection and interrelationships between the “domestic” financial system and the global financial system.

At the international level, it entails developing understanding of global financial system risks and the global financial network, by taking account of the cross-border relationships and interconnections between “domestic” financial systems, and of the buildup of global risk concentrations.

ii. Market Integrity

Market supervisory authorities have responsibility for the integrity of financial markets to ensure that participants have trust that conditions are fair, orderly and competitive and are not subject to manipulation or other forms of abuse.

¹⁸ Albeit complemented with some regional arrangements, for example in the European Union, and recognizing that standards are often set globally through standard-setting bodies such as the Basel Committee, IAIS and IOSCO, with co-ordination of policy development at national and international levels provided by the FSB.

To support their work, market authorities need accurate information on relationships within firms and of aggregate exposures and positions, to ensure that the positions of interrelated and connected entities can be aggregated together to take a firm-wide view. Such an approach is needed, for example, to ensure that position limits can be policed effectively, and cannot be circumvented by a firm undertaking trades through a related entity that is not taken into account in the limit. Given the risks to market integrity through collusion, market supervision authorities are particularly alert to the connection between entities and the possibility of firms exerting influence and control through indirect relationships such as significant shareholdings and contractual arrangements.

Relationships between firms are also a key for assessing the risks of cartels and monopoly power, and of firms acting in concert to support a particular market position or view. Authorities are consequently alert to elements such as the protection of market-sensitive information and ensuring that restrictions are in place to prevent this being transmitted to other firms through relationships or contractual arrangements.

iii. Know Your Client

Relatedly, important elements of financial market supervision are arrangements to “know your client” to help protect against financial fraud or the avoidance of anti-money-laundering restrictions. The arrangements require accurate checks on parties wishing to undertake financial transactions or market trades.

From the standpoint of money-laundering and tax-evasion considerations, the concepts of beneficial ownership and control are most prominent. The World Bank’s “The Puppet Masters” paper provides the FATF definition of beneficial ownership that is widely accepted internationally and which reads as “*beneficial owner refers to the natural person(s) who ultimately owns or controls a customer and/or the person on whose behalf a transaction is being conducted. It also incorporates those persons who exercise ultimate effective control over a legal person or arrangement.*”¹⁹ The paper notes that while “traditional” corporate structures allow tracking the ownership—the shareholders, the situation is more problematic in case of alternative types of corporate vehicles such as trusts. That brings forward the concept of beneficial ownership—defined in the World Bank’s paper as “*one that strictly delineates a set of sufficient conditions that qualify certain owners, controllers, and beneficiaries unequivocally as the beneficial owners of a corporate vehicle.*” “*Beneficial ownership*” pierces through the parties, who (like the corporate vehicles) merely represent the mode by which the will of the final actor is being affected.”

The aim of this analysis is to be clear on the legal status of the party and of any relationships or controls such as beneficial ownership. Highly complex structures within firms and financial trusts, entailing multiple layers of ownership and control of entities across a number of countries, can in some cases make it very difficult to track financial transactions and to check that anti-money-laundering principles are applied.

¹⁹ Van der Does de Willebois, E., E. Halter, R. Harrison, J. Park and J. Sharman (2011), “The Puppet Masters,” World Bank.

iv. Statistical Consolidation

Statisticians must provide consistent information to support the assessment of financial system risks. A particular challenge is how to pull together and consolidate information within corporate groups, defined on the basis of control between institutional units (parents and subsidiaries). As noted in a paper prepared for a workshop of the Irving Fisher Committee for Central Bank Statistics²⁰:

The criteria for determining control may not always be straightforward. A single unit owning more than half the voting shares is generally sufficient to establish the control-relationship. However, the ability to determine general corporate policy may also be achieved in some cases with the ownership of less than half of the voting shares.

The first example is that of an associate. This is a corporation over which the investor has a significant degree of influence but which is not a subsidiary or joint venture. Significant influence is usually assumed to arise when the investor owns from 10 to 20 percent (depending on national practice) and 50 percent of the equity/voting power of the entity. Such a situation often applies to corporations controlled by government units. Although some corporations may be able to exert considerable influence over their associates, this cannot be guaranteed. The relationship between associates is weaker than that between parent and subsidiary corporations, and associates may not be well defined. Associates would normally not be included in a corporate group.²¹

Two other examples where less than half of ownership may give control are (i) when ownership of shares is widely diffused among a large number of shareholders, and (ii) when a small organized group of shareholders with more than half of combined ownership of shares can establish control by acting in concert.

Statisticians face difficult challenges in interpreting data supplied by complex global financial institutions, which operate in different sectors (such as banking, insurance and asset management) through branches and subsidiaries that are located in different jurisdictions, and which may also undertake cross-border transactions, given the policy requirements to produce information on intra-sector and cross-border risks, and to separate “domestic” from “international” transactions.

²⁰ IFC Working Paper No. 8, “Residency/Local and Nationality/Global Views of Financial Positions.”

²¹ In the context of establishing a direct investment relationship, balance of payments guidelines distinguish between control (defined as owning more than 50 percent of voting power) and significant degree of influence (owning between 10 and 50 percent of voting power). Both are defined as direct investment relationships. The Coordinated Direct Investment Survey proposes compiling, as an additional item, foreign direct investment data on an ultimate investor basis. The ultimate investor is the direct investor in the chain of the control relationship (more than half the voting power) that is not controlled by another investor.

To meet these objectives, statistical authorities need to prepare detailed, clear and consistent guidelines and standards to underpin data production. Information may be prepared on different bases to support different forms of analysis. As one example, the BIS produces international banking statistics on both a locational basis, i.e., cross-border positions of all banks located in country A (of whatever nationality of ownership) to entities located in countries B and C²² and on a consolidated basis, which reports the cross-border claims of consolidated banking groups headquartered in country A to residents in country B and C, etc. In particular, the consolidated banking statistics report banks' on-balance-sheet financial claims (i.e., contractual lending) vis-à-vis the rest of the world and provide a measure of the risk exposures of lenders' national banking systems. The data cover contractual (immediate borrower) and ultimate risk lending by the head office and all its branches and subsidiaries on a worldwide consolidated basis, net of inter-office accounts. Reporting of lending in this way allows the allocation of claims to the bank entity that would bear the losses as a result of default by borrowers.

Guidelines on consolidation principles underpin the data collection. Different approaches are applied in different cases, supporting the need for flexibility of systems. For example, the IMF Financial Soundness Indicators guidelines distinguish four approaches to consolidation²³:

1. Intra-group consolidation—entailing the elimination of all flows as well as all positions among members of an enterprise group. An enterprise group consists of the parent, its branches, and subsidiaries. All institutional units controlled by the parent are consolidated as if they represent a single institutional unit.
2. Inter-group consolidation—applicable for data at the sector level, and involving the elimination of flows and positions among enterprise groups belonging to the same sector. All enterprise groups within the same sector are consolidated as if they represent a single consolidated unit. Sector consolidated data eliminate flows and positions among units that are not in a control relationship.
3. Cross-border consolidation involves a parent and units (residents and non-residents) under its control that are classified in the same sector.
4. Cross-sector consolidation involves a parent and units under its control that are classified in more than one sector.

Having presented a plethora of different types of relationship and variously defined ownership and control concepts used for different regulatory as well as business purposes, the question that arises is whether there is, first of all, a technical solution that could provide a single platform to accommodate all those heterogeneous representations of the relationships, and, secondly, whether there are legal and regulatory mechanisms available to bring certain standardization to the underlying

²² The key organizational criteria are the country of residence of the reporting banks and their counterparties as well as the recording of all positions on a gross basis, including those vis-à-vis own affiliates.

²³ <http://www.imf.org/external/pubs/ft/fsi/guide/2006/>.

types of relationship irrespective of the ownership and control definitions. The rest of the paper will look at those considerations.

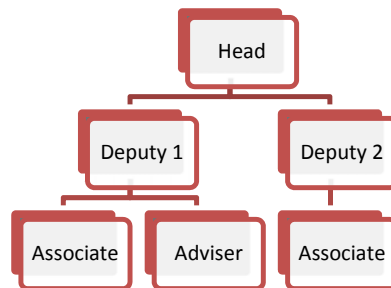
3. Relationship Data Models

Generally speaking, a data model describes the structure of a database's information content. Three kinds of models are commonly used for different purposes: (1) conceptual data model that specifies organizational data independent of any particular technical solution; (2) logical data model that normally includes data structure, data manipulation and data integrity rules; and (3) physical data model that depicts how logical models are designed, usually to estimate data storage requirements. As described and defined, the logical database design can be seen as a translation of a conceptual data model into a logical data model to ensure that the data system fulfils the required conditions such as flexibility and data exchange capabilities. For the purpose of the discussion of relationship data, attention needs to be paid to the logical model design as this ultimately defines the flexibility and adaptability of the implemented technical solution.

There are four types of logical data models:

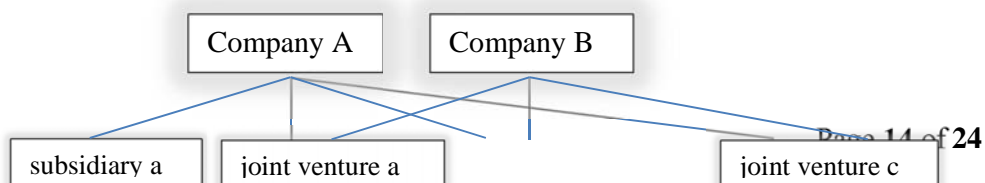
a. Hierarchical Data Model

Such a model is usually depicted in a tree-like fashion and is used to model one-to-many relationships. As in a family hierarchy, the upper element in the tree is linked to the lower elements on the basis that a “parent” can have more than one child while a “child” can have only one parent. Below is an example of a hierarchical database.



b. Network Data Model

The network database model goes a step further and allows the representation of many-to-many relationships. Following the family example, it means that while a parent can have multiple children, a child as well can have multiple parents. This is how it will look graphically:



joint venture b

c. Relational Data Model

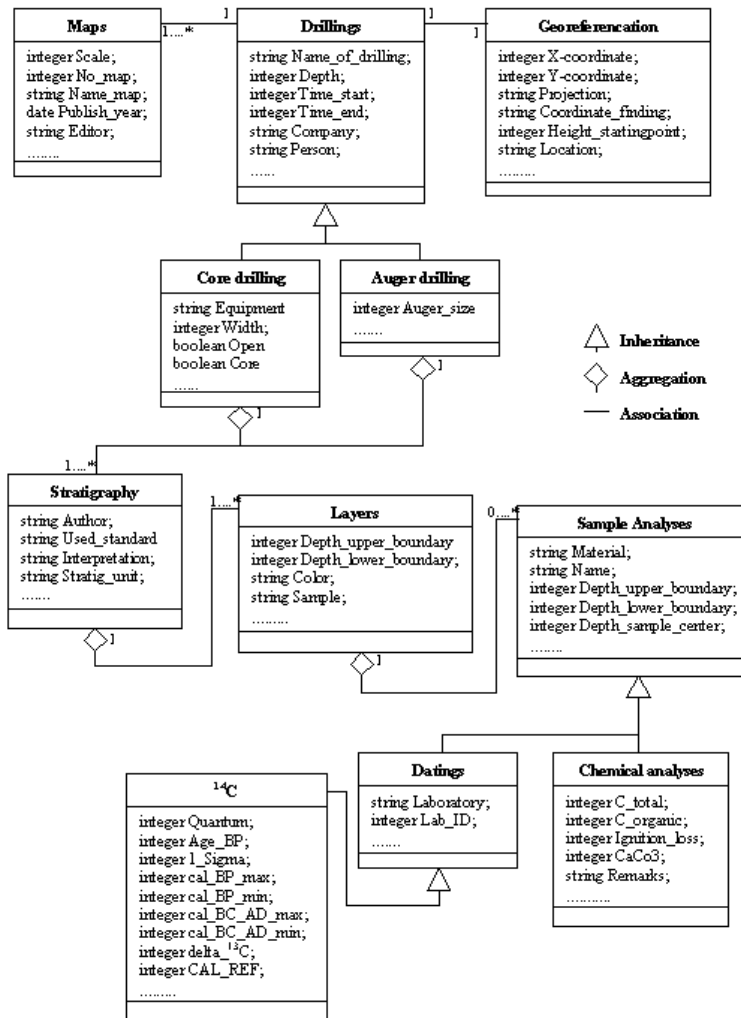
The relational database model organizes data into tables. Usually a database will have many tables where columns are commonly known to be attributes and rows are records. Each table will have attributes, which are designated to be a “key.” That is necessary for unique identification of each record. Below is an example of how it will normally look:

Patient number	Patient name	Insurance number	Insurance name	Patient number	Medicine number	Medicine name	Medicine dose
0001	Juan	abc	Senitas	0001	ab1	aspirin	X
0002	Mary	123	MetLife	0002	ab1	Lipitor	Y
0003	Wei	A1b2	Ping An	0003	cd2	ibuprofen	Z
Medicine number	Provider number	Provider name	Currency code	Currency code	Account number	Bank number	Bank name
ab1	100	BCD	EUR	EUR	8469789793	01	Santander
ab1	200	AIC	USD	USD	525479735	01	Santander
cd2	300	PIC	CNY	CNY	97375974	02	Bank of China

d. Object-Oriented Data Model

This is the model of the future. In this model each element is organized as an object. Everything can be an object—a data element, a relationship, graphics, etc. The advantage is that an object can contain both data and a method. That allows it to represent both structure and behavior (for example, the ability to have shareholdings and to own stocks, or voting rights, etc.). Because design is based on objects as building blocks, the model is reusable for analysis, design and programming, and provides system robustness and general flexibility. Below is a graphical example of the model (adopted from GeoComputation²⁴).

²⁴ http://www.geocomputation.org/1999/053/gc_053.htm.



While the object-oriented model does not incorporate the structure offered by the relational database model (the most heavily used model nowadays), it delivers the critical elements of extensibility and flexibility by allowing the insertion and reuse of codes. With the focus on the object itself and its encapsulation of both attributes and methods, the approach allows the creation of new characteristics and behaviors, deletions, retrieval and updating of objects and their properties.

When dealing with the multitude of relationship types, the object-oriented model allows the representation of different ownership and control definitions through presenting an actor and its relationships in an agnostic, non-predefined manner. In such a structure the focus is on entity A and entity B and, for example, common stock ownership as a relationship type. In this example, the model does not prescribe control at 20 percent or 50 percent or 100 percent of common stock ownership, but allows the modeling of any definition of control by querying the relations at different thresholds (or on different bases).

The challenge of the technical solution to provide the flexibility of development and of uses is not in the design and implementation of the object-oriented databases but in

effecting a transition from relational data models that have been dominant in the marketplace. Over the past few years there has been an initial migration from the relational model to an object-oriented model. Hybrid approaches to leverage relational models with elements of object-oriented approaches have been introduced. From the technical feasibility standpoint, the object-oriented data model is well-developed and implementable to support the achievement of multiple data use cases needed by financial markets stakeholders in the area of relationship data by utilizing the single set of “objects.” The challenge is to drive the implementation forward.

4. Flexible Relationship Data Models Are the Approach of the Future

Given the multitude of practical use cases for data aggregation to support risk management, market integrity, network and statistical analysis (both within and cross-borders), the natural questions for users (be they risk analysts or regulatory compliance specialists, financial stability policymakers or others) and data professionals are to how utilize the company-wide enterprise data management approach and a common or single data source at a granular level, while preserving subsequent flexibility in system use. This presents a challenge to data specialists faced either with the choice between the introduction of a targeted solution to a particular problem at hand by designing a system to address that problem, recognizing the likely future requirement to map and reconcile this bespoke system with other enterprise systems, or whether to transition to a single flexible platform that allows multiple uses and which readily accommodates the necessary additions and modifications within that common platform as new requirements arise. Reflecting the increase in data volumes, the complexity of queries, and rapid changes in market structure and products, the flexible approach offered by the object-oriented data model will be the technical choice in more and more cases. The technological capabilities are already available to develop an enterprise plan to transition to that solution.

With the technical obstacles addressed, what are the other challenges that policymakers and practitioners face?

A particular challenge faced by data professionals in developing and maintaining information systems is in the internal enterprises’ ability to achieve reconciliation of various definitions of the same “things” to legal contracts and regulatory requirements. The difficulty in undertaking this mapping and reconciliation is an obstacle to the referencing of a single data element for different purposes be it a counterparty, instrument, relationship, etc. A commonly accepted dictionary of terms used in the financial markets is necessary to allow a cost-effective and efficient implementation of such data systems. For this matter, the benefit of the recently implemented global Legal Entity Identifier system is that it provides a uniform representation of a financial market counterparty regardless of its particular role in a particular situation. That allows this data object to be used in multiple applications for different purposes. Nevertheless, from the standpoint of defining relationships between those counterparties, as identified before, one needs a uniform representation of contractual elements between those counterparties that can be modeled as a part of the data model. It is very hard to imagine that given continuing financial innovation and corresponding regulation that the granularity of required data will go down. Rather, recognizing the increased adoption of various models of stress testing and demands for complex network system analysis, the requirements for granular defined

data elements and their interactions will increase. That strengthens the conclusion that the collection and storage of granular data without a prescribed threshold of interactions between the data elements will be the path for the future development of data systems.

From the legal standpoint, internal coordination within companies among legal, business and technology units will be necessary to ensure that the concepts within legal contracts correspond to (or can be uniquely mapped to) the concepts used by business units for both execution and risk management, as well as regulatory compliance, and that those concepts are adequately modeled by data technology professionals to support their multiple use. A major hurdle is that there is currently a noticeable disconnect between legal experts setting up standards for legal contracts and data experts developing data standards and schemas. Moreover, the often proprietary nature of those standards creates incentives to protect the status quo and to resist any collaborative solutions. And the challenge of stakeholder coordination is amplified by the fragmentation of users across sectors, type of participants or geographical location. While there is a hope that cost-benefit considerations will encourage financial market participants to take forward collectively the introduction of common definitions of concepts, there is a significant probability that public sector involvement may ultimately be needed to help overcome this collective action problem of the development of common definitions to describe the underlying legal and economic concepts utilized in both financial contracts and risk management systems.

In addressing the global map of relationship data, the legal obstacles relating to data disclosure present one of the biggest challenges from the perspective of public transparency. We will not engage in the arguments relating to public transparency versus business secrecy. However, the recent trend in information demands clearly indicates that global relationship data will be requested by more and more public authorities if not solely for the purpose of risk management and financial stability, but rather also for the purpose of monitoring tax evasion, money laundering and terrorism financing. As violation of the latter requirements often carries severe sanctions and criminal charges, the internal maintenance of complete relationship data has become an unavoidable necessity for market participants, regardless of whether complete relationship data is published for open public access or not. There is likely to be increasing cost pressure to integrate current separate relationship data management systems for tax evasion and money laundering (e.g., FATCA), internal risk management and regulatory requirements, each with different granularities and scope and scale of coverage. That will further motivate the development of the flexible object-oriented system.

Finally, probably the most challenging part of the puzzle is to achieve the harmonization of regulatory requirements and their definitions and standards among individual domestic regulators, taking into account the need for consistent cross-border application of rules, as well as recognizing the different scope of requirements for large versus small institutions and objectives of different authorities. Notwithstanding the procedural requirements imposed on individual regulatory agencies in relation to modifications to reporting requirements and risk management rules, there is considerable scope to save resources by minimizing duplicative data collections and processing. Given the increase in data volumes and data complexity,

attempts by agencies to solve such data problems individually, while potentially successful at the individual level, are likely to result in an inefficient outcome at the economy-wide level given the duplication of efforts and costs. It should be emphasized here that the essence of the solution is not in greater automation, putting in more servers or hiring of IT specialists in the governmental agencies, but rather in adherence by government agencies to commonly agreed and accepted financial data definitions and standards.

Development of a general data governance strategy at a national level is becoming increasingly important to ensure the minimization of the duplication of efforts by government institutions as well as to address gaps in data collection. The ultimate question that each government needs to answer is not who collects and stores information, but how the data collection standards are developed and governed. While it may make perfect sense for individual regulatory agencies to want to collect counterparty data individually to support their particular policy objectives, what does not make sense is when each agency defines and represents a counterparty in a different manner. It does not matter how the agencies approach relationship data, what matters is that they reach agreement on how these relationships can be represented and the minimum granularity threshold at which these relationships are captured. That means that it is pointless to try to agree whether 5 percent, 20 percent or 50 percent stock ownership means control or not. All three thresholds can be relevant to the representation of rights to control in different circumstances. What we should strive to implement is a neutral collection of relationship data components, starting at an agreed minimum level and with pre-defined granularity intervals that will allow the use of the same data source to model either 5 percent or 20 percent or 50 percent (or other) ownership control thresholds from a single data source.

5. The Transition from Flat to Flexible Relationship Data

It would not be fair to say that markets do not have a common financial data representation because the public sector does not require it, nor would it be fair to say that the public sector cannot utilize common standards because market participants cannot agree on them. The problem we face is a collective action problem that has led to a myriad of proprietary solutions, first-mover disadvantage and network externality considerations. There are successful examples of the private sector overcoming the barriers through internal negotiations (the GS1 “bar code” system is a valuable example) or through public sector intervention to promote the development and imposition of a global standard (global LEI initiative). Overall, the financial sector has a relatively weak track record of being able to reach consensus solutions without external intervention. However, with the introduction of more and more transparency measures, one wonders whether the cost-benefit trade-off may start to tilt in favor of the benefits of greater standardization to allow “cheaper” transparency that will consolidate private sector efforts to agree and implement common relationship data standards.

6. Next Steps—Short-Term Priorities

When it comes to the development of relationship data, in our judgment the priority should be to refocus attention from rather fruitless and otiose collective discussions of what entails ownership and control, and instead to focus on the collection of granular

data of defined relationship types that allow and support the modeling of any definition of ownership and control required by particular users.

Secondly, three channels of communication need to be established:

- Company-wide—communication among legal, business and data units with the purpose of development and implementation of common definitions of concepts and relationships;
- Public sector—communication among regulators on domestic as well as global levels to agree on common definitions of concepts and relationships;
- Public-private sector—communication to align and combine definitions of concepts and relationship.

The reality of today's financial markets is that many of its sophisticated participants would be better to be described as financial technology companies operating in financial markets rather than purely financial companies. Data and technology are no longer a competitive advantage but an essential element of a major financial sector business. Competitive forces are likely to contribute to further commoditization of data. Private market incentives to create greater standardization to achieve cost reduction benefits are likely to increase as margins from proprietary solutions will continue to decline. Relationship data is a fundamental element for any enterprise, so this element is a high priority. A particularly interesting question with respect to efforts to standardize relationship data is whether it will be driven by data users or by data vendors who currently have business models based on the outsourcing of relationship data needs by end-users. To a large degree, this is likely to be determined by regulatory requirements and with whom the ultimate responsibility for data accuracy resides.

The most expedient way to drive standardization of relationship data is via agreement by regulatory agencies to use the same basic definitions and relationship concepts across all regulatory reporting requirements (irrespective of the threshold used by a particular agency). That would promote the quickest and largest scale shift in the market in the representation of relationship data. It should be noted that from the standpoint of risk management, data granularity requirements should be similar for internal risk control and regulatory risk oversight. However, when introducing other regulatory requirements—for example, to support market integrity—public-private consultations are necessary to ensure that, for example, the KYC firms require and regulatory market integrity requirements are compatible among other regulatory data uses. It is important to emphasize that the success of this approach is based on a robust method of financial data governance among the regulatory community that provides for a flexible and quick route to introduce additional definitions and concepts into the common dictionary on a multilateral basis.

From the standpoint of practical implementation of this approach to relationship data standardization, for example in the United States, we would suggest that the next step should be an objective and credible cost-benefit analysis of the introduction of common relationship data depiction and analysis of methods across all government agencies, and a time frame to transition to such common relationship data depiction. In the environment of tight government budgets, there is an obvious budget-saving consideration resulting from the standardization of relationship data, which would

also promote the U.S. regulatory agency coordination and rule-making processes to facilitate the gradual convergence to the common relationship data standards. And once there is credible evidence from the public sector supporting and promoting the transition, the private sector will be able to migrate relatively quickly to new standards with significant savings to their own data management systems and services.

Financial data is not a cost center but an investment opportunity.

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