

# 1 Introduction

Very definitely there is a whole host of topics related to clearing. I believe that clearing is a topic that has always been regarded as sort of an operational thing. The exchanges' matching engines have had the glamour. But I think in the long run the value added of clearing exceed the value-added of matching!<sup>1</sup>

Clearing is often regarded as less glamorous than the creative and headline-grabbing business of trading,<sup>2</sup> but it constitutes the core of modern financial market infrastructure.<sup>3</sup> Clearing services not only benefit individual market participants, but markets as a whole by increasing their efficiency. Actually: 'this dimension of financial markets is fundamental for the proper functioning of the whole. It is, in fact, the very essence of the markets, because it constitutes the basic process of exchange between buyers and sellers.'<sup>4</sup>

When buyers and sellers execute a trade, they enter into a specific legal obligation, i.e. to buy or sell securities<sup>5</sup> or, in the case of derivatives,<sup>6</sup> another underlying. The life cycle of a trade consists of trading, clearing and settlement. Clearing and settlement are commonly referred to as post-trade services. Commonly mentioned in the same breath, the two terms are often confused or thought to be synonymous. Whilst settlement refers to the fulfilment of the legal obligation,<sup>7</sup> clearing is the process that occurs in between execution and

<sup>1</sup> Interview with James G. McCormick.      <sup>2</sup> Cf. Berliand (2006), p. 27.  
<sup>3</sup> Cf. Dale (1998c), p. 230.      <sup>4</sup> European Commission (ed.) (2006a), pp. 2–3.  
<sup>5</sup> Securities comprise cash equities, such as stocks, and fixed income products. Cf. Deutsche Börse Group (ed.) (2005a), p. 7.  
<sup>6</sup> Derivatives (including futures and options) are financial instruments that derive their value from some other item, i.e. the so-called 'underlying'. An underlying can be a security, group of securities, an index, interest rates, currencies, commodities, etc. A 'future' is the obligation to buy or sell the respective underlying at a certain time in the future for a certain price. In the case of the buyer, an 'option' is the right, but not the obligation, to take or make delivery of the respective underlying. For the seller, an option is the obligation to take or make delivery of the underlying.  
<sup>7</sup> Settlement is often performed by a so-called Central Securities Depository (CSD) or International Central Securities Depository (ICSD), which holds the security and performs the transfer of the title from the seller to the buyer. Refer to Chapter 2 for other possible settlement institutions. Another comingling

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settlement, i.e. during the respective time lag. In the context of trading securities, this time lag is usually minimal, but it can be substantial in derivatives trading. During this lag, trades need to be processed, managed, monitored and ultimately prepared for settlement.<sup>8</sup> Clearing is usually carried out by a so-called clearing house, which can either be a department of an exchange or a separate (independent) legal entity carrying out the designated function of clearing. Most clearing houses today act as a central counterparty (CCP). In this role, the clearing house is legally involved in every trade by becoming the buyer to every seller and the seller to every buyer, thus replacing the original counterparties.

The importance of post-trade services – and of clearing in particular – is rooted in the fact that financial market transactions commonly do not involve goods that are physically exchanged. The traded instruments often do not even exist physically. This level of abstraction, as well as the immobilisation and dematerialisation of traditional paper-form securities, has transformed the modern post-trade infrastructure.<sup>9</sup>

**1.1 Problem definition**

There are important economic gains to be had from improving the efficiency of cross-frontier clearing . . . What has proved more elusive is finding the best way of achieving this.<sup>10</sup>

There is general consensus that smoothly running and efficient post-trade services are a necessary precondition for the efficient functioning of financial markets. These services are also considered indispensable for economic growth and financial markets integration.<sup>11</sup> ‘From a market perspective, their importance derives from the fact that clearing and settlement costs can be viewed as a subset of transaction costs. These are the costs faced by an investor when carrying out a trade. Expensive and inefficient clearing and settlement limit the development of efficient markets.’<sup>12</sup>

of terms often occurs with reference to the process and function of settlement and safekeeping (custody). Closely associated with securities settlement are custody services. The final phase of a securities transaction, once settlement has occurred, consists in the custody service. Custody refers to the safekeeping of assets and the administration of these securities on behalf of intermediaries and investors. For the purpose of this study, the term ‘settlement’ refers to the integrated services provided by CSDs and ICSDs.

<sup>8</sup> For a detailed definition of clearing, see Chapter 2.      <sup>9</sup> Cf. Huang (2006), p. 10.

<sup>10</sup> McCreevy (2006a), p. 2.      <sup>11</sup> Cf. European Commission (ed.) (2006a), pp. 2–3.

<sup>12</sup> Tumpel-Gugerell (2006).

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## 3

## Introduction

In light of rapidly growing cross-border trading volumes, the sophistication of information technology, financial market deregulation, and the ongoing integration and harmonisation of the financial market infrastructure, building a sound, efficient and integrated post-trade infrastructure has become both a focus area for market participants<sup>13</sup> and a goal for official policy<sup>14</sup> – particularly in the United States (US) and Europe.<sup>15</sup>

Despite this shared goal, there is currently no consensus on how actually to measure the efficiency of post-trade services.<sup>16</sup> Additionally, although it is generally believed that integration and harmonisation of the post-trade industry serves to increase its efficiency, there is no unequivocal structural preference among public and private stakeholders. At the centre of this debate is the question of whether a monopolistic single entity within a defined economic area is better suited to realise an efficient and integrated clearing infrastructure than are several competing, differently organised, but possibly interlinked entities. This persistent lack of consensus on the most preferable (in terms of efficiency) future structure of the post-trade industry has sparked special concern as well as a broad dispute among public and private stakeholders of post-trade services in the US and Europe.

In the US, this debate has been raging for several decades. While Congress put an end to further discussions about the securities and options post-trade industry by encouraging the establishment of centralised clearing and settlement arrangements in the late 1980s and early 1990s, there is no such policy mandate for the futures clearing industry.<sup>17</sup> Market participants (such as exchanges, clearing houses, banks/brokers and investors) have thus maintained recurring consultations and discussions on the most preferable structure of the US futures clearing industry – but have so far failed to reach consensus. Notably, since the announcement of the merger of the two Chicago futures exchanges on 17 October 2006 – the Chicago Mercantile Exchange (CME) and the Chicago Board of Trade (CBOT) – the debate has regained traction in the American public and private sectors.

In Europe, other issues have driven the quest for the optimal structure for the post-trade industry. The launch of the European Monetary Union, particularly the introduction of the euro, has put European market integration at

<sup>13</sup> See, e.g. JPMorgan (ed.) (2005), p. 1; and Merrill Lynch (ed.) (2006), p. 6.

<sup>14</sup> Cf. Corporation of London (ed.) (2005), p. 10.

<sup>15</sup> References to Europe in the context of this study refer to the European Union.

<sup>16</sup> Cf. European Commission (ed.) (2006e), p. 1.

<sup>17</sup> For details on the American clearing industry, refer to section 2.5.2.

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the top of the financial agenda.<sup>18</sup> An efficient post-trade industry is considered a prerequisite for advancing the integrative process as well as for reaping the full benefits of an integrated European financial market.<sup>19</sup> The development of clearing and settlement arrangements is therefore considered to be of great strategic importance for the European economy.<sup>20</sup> While the first efforts to improve the efficiency of European post-trade arrangements date back to the 1970s,<sup>21</sup> the debate on industry structure and its efficiency gained significant momentum between 2004 and 2006, when the European Commission (the Commission) launched its consultative and policy-oriented communication on measures to improve the efficiency of clearing and settlement. The communication included a proposal to prepare a framework directive on clearing and settlement aimed at increasing the efficiency of the European post-trade industry.<sup>22</sup> The Commission ultimately dropped the proposal in 2006 in favour of an industry-led approach:

One thing I am absolutely sure about is: whatever we do, we should work with the grain of the market. The role of the Commission is not to pick winners nor dictate a particular outcome. Nor determine the final architecture. Many have argued that a pan-European clearing and settlement system operated as a utility would be the best solution for capital markets in the EU. They may be right. Again, it is not our role to impose a particular model on the market. The Commission's role is to ensure the markets work efficiently, that unnecessary barriers are done away with and that EU Treaty provisions, particularly competition policy, are applied to the full.<sup>23</sup>

The Commission's initiative culminated in the development of a Code of Conduct (the Code), sponsored by Internal Market and Services Commissioner Charlie McCreevy. It was signed and prepared by the three main European industry associations and their members in November 2006.<sup>24</sup> The initial scope of the Code applies exclusively to the post-trade processes of cash equities. The decision to focus on cash equities was spurred by various factors: the soaring cross-border trading volumes in cash equities have shifted investors'

<sup>18</sup> Cf. European Central Bank (ed.) (2001a), p. 15; Bank of New York (ed.) (2004), p. 1; and Chabert/Chanel-Reynaud (2005), p. 1.

<sup>19</sup> Cf. European Commission (ed.) (2006a), p. 2.

<sup>20</sup> Cf. Werner (2003), p. 17; Group of Thirty (ed.) (2003), p. 1; and Köppl/Monnet (2007), p. 3017.

<sup>21</sup> Cf. European Commission (ed.) (2006a), p. 3.

<sup>22</sup> For details of the European Commission's strategy with regard to clearing and settlement, refer to European Commission (ed.) (28.04.2004); and European Commission (ed.) (2006a), pp. 32–9.

<sup>23</sup> McCreevy (2006a), p. 3.

<sup>24</sup> The three main industry associations are the Federation of European Securities Exchanges (FESE), the European Association of Central Counterparty Clearing Houses (EACH) and the European Central Securities Depositories Association (ECSDA).

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focus to driving down the related costs;<sup>25</sup> studies comparing European and American cross-border securities settlement costs intensified the call to overhaul the European securities clearing and settlement system;<sup>26</sup> and discussions about European stock exchange consolidation also served to put cash equities post-trading arrangements into the limelight.<sup>27</sup>

While the measures detailed in the Code address the areas of transparency of prices and services, access and interoperability, and the unbundling of services and accounting separation, they do not codify a particular industry structure.<sup>28</sup> The Code provides a framework for the future development of European cash equities clearing, but European clearing houses must still find a way to implement the Code. The solution to creating a more efficient European post-trade industry remains elusive because it involves highly complex structural issues.<sup>29</sup> It is therefore hardly surprising that disagreement vis-à-vis the optimal structure of the industry continues to prevail. European market participants, such as exchanges, clearing houses, banks and investors, have thus been conducting ongoing consultations with the European Commission as well as public discussions on the most preferable future structure of the clearing industry – but stakeholders have not yet reached a consensus.

The debate on the efficiency and structure of the European post-trade industry – particularly concerning derivatives clearing – has regained significant traction since the Commission invited comments on its endeavour to extend gradually the scope of the Code to include post-trade arrangements of fixed income and derivatives instruments in October 2007.<sup>30</sup>

Finally, the efforts to establish a consensus on the most preferable future structure of the post-trade industry have been complicated by the comingling of the post-trade services terms ‘clearing’ and ‘settlement’. As outlined above, the two terms are frequently – and mistakenly – used interchangeably in the public discussions accompanying the efforts to create a smoothly functioning post-trade infrastructure; academic and non-academic publications commit the same fallacy. While this partly results from the lack of generally accepted, clear-cut definitions, few people – even within the financial industry – understand the complex mechanics of post-trade services and their

<sup>25</sup> Cf. Goldberg *et al.* (2002), p. 3; and European Parliamentary Financial Services Forum (ed.) (2006), p. 1.

<sup>26</sup> Cf. Werner (2003), p. 17.      <sup>27</sup> Cf. AFEI *et al.* (eds.) (2006), p. 1.

<sup>28</sup> Cf. FESE/EACH/ECSDA (eds.) (2006); and European Commission (ed.) (02.11.2006). Refer to [http://ec.europa.eu/internal\\_market/financial-markets/clearing/communication\\_en.htm](http://ec.europa.eu/internal_market/financial-markets/clearing/communication_en.htm) for details on the European Commission’s communication, the Code of Conduct, and other documents.

<sup>29</sup> Cf. Lannoo/Levin (2003), p. 2.      <sup>30</sup> Cf. European Commission (ed.) (2007), p. 3.

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different providers in detail.<sup>31</sup> However, even among experts, negligent use of the terminology is widespread.

**1.2 Literature and research gap**

Since the launch of the European Monetary Union, an increasing number of academic and non-academic publications researching the issues of industry structure and efficiency of European post-trading arrangements have emerged. Nonetheless, an important – but commonly overlooked – research gap persists: the majority of these studies analyse cross-border settlement and safekeeping arrangements between (International) Central Securities Depositories, but neglect CCP clearing issues. The common comingling of the terms ‘clearing’ and ‘settlement’ only serves to obscure this major shortcoming, especially in the eyes of non-experts. When studies claim to analyse post-trading arrangements, they imply a comprehensive analysis of both clearing and settlement issues; yet most publications have exclusively concentrated on post-trade services provided by CSDs/ICSDs.<sup>32</sup> The often negligent or imprecise use of terminology in this context threatens to erode steadily the discussion on the most preferable structure of the European post-trading industry due to the spurious implication that findings on CSD/ICSD issues cover all relevant clearing issues.

The Code was explicitly designed to increase the efficiency of cash equities clearing *and* settlement arrangements in Europe, thus giving direction to the development of CSDs/ICSDs *and* CCPs. It should be noted, however, that due to the aforementioned gap in research, there were no studies on the industry structure and efficiency of European CCP arrangements to consult for the Code’s establishment. The European Commission has acknowledged the gap: ‘In fact, we are not aware of any empirical studies of European CCP activities.’<sup>33</sup>

As the limited contributions on the industry structure and efficiency of European CCP arrangements are essentially by-products of CSD/ICSD-related studies, a brief overview of relevant literature is provided in the following. This serves to clarify which studies concentrate on settlement and safekeeping arrangements between CSDs/ICSDs, but leave aside CCP

<sup>31</sup> Cf. Group of Thirty (ed.) (2003), p. 2.  
<sup>32</sup> Cf. EACH (ed.) (2004a), p. 1; and EACH (ed.) (2004b), p. 1.  
<sup>33</sup> European Commission (ed.) (2006c), pp. 8–9.

clearing issues, as opposed to contributions which take CCP arrangements into account.

Hart/Russo/Schönenberger (2002) chart the evolution of CCP services in Europe and the United States. Scott (2003) performs a comprehensive analysis of the key issues surrounding strategic developments in the clearing and settlement industry. A report published by London Economics (ed.) (2005) provides a description of the securities trading, clearing and settlement infrastructures of the cash equities and bonds markets in the 25 Member States of the European Union (EU) as of March 2005. These contributions are among the few covering CCP-related issues.

A significantly larger number of studies have been devoted to the organisation of the European post-trade industry, with a particular focus on CSD/ICSD arrangements: Malkamäki/Topi (1999) analyse the major trends and driving forces of change in securities settlement systems. Various publications investigate the state and process of the ongoing integration of the European securities post-trade infrastructure; these studies identify sources of inefficiency in the current CSD/ICSD cross-border arrangements and measures to counteract them; see, e.g. Russo/Terol (2000), Giovannini Group (ed.) (2001), Giovannini Group (ed.) (2003), Hirata de Carvalho (2004) and Baums/Cahn (2006). Schmiedel/Schönenberger (2005) and the European Commission (ed.) (2006c) include CCP arrangements in their respective analyses. Schulze/Baur (2006) underscore the importance of integrating and harmonising the European post-trade industry with their finding that an 18 per cent reduction in securities clearing and settlement costs could increase the gross domestic product by around 0.6 per cent in the EU.

Milne (2005) reviews the role of standard setting as it affects competition in securities settlement, in the light of the establishment of pan-European and global arrangements for securities settlement. Löber (2006) presents and evaluates the existing EU legislative framework for post-trade arrangements and describes current EU initiatives to increase efficiency, with a specific focus on legal CSD/ICSD-related aspects. Huang (2006) examines legal and regulatory issues pertaining to CCPs and explains why the application of CCP clearing could have ramifications for Europe and beyond. The author also briefly explores the case for a Single CCP at both the European and global levels, concluding that:

In an ideal world, a single robust and efficient CCP with effective risk management, operating within the EU or even across the globe, would be able to maximise the effect of transaction offsetting and better risk management with more efficient collateral



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management for the markets. In practice, the approach of maintaining a level of competition in financial services may seem more likely, in the EU in particular.<sup>34</sup>

Several contributions to the field analyse and discuss alternative models for European securities settlement. Giddy/Saunders/Walter (1996), Giordano (2002), Niels/Barnes/van Dijk (2003), Chabert/Chanel-Reynaud (2005) and Chabert/El Idrissi (2005) research frictions in the settlement of European cross-border transactions and discuss alternative scenarios for a more integrated approach to European settlement arrangements. Milne (2002) examines how competitive forces can be harnessed to further the integration and consolidation of European post-trading arrangements, especially with respect to securities settlement. A number of studies present theoretical models designed to provide conclusions on the future structure of European settlement and safekeeping arrangements. Kauko (2002), Werner (2003), Tapking/Yang (2004), Holthausen/Tapking (2004), Rochet (2005), Kauko (2005), Van Cayseele (2005) and Köppl/Monnet (2007) all provide alternative models. Kröpfl (2003), Van Cauwenberge (2003), Serifsoy/Weiß (2005), Van Cayseele/Voor de Mededinging (2005) and Knieps (2006) contribute to the debate on the structure and organisation of European CSDs/ICSDs. Milne (2007) provides a detailed review and discussion of many of these and other papers.

Increasingly, empirical studies are investigating the existence of economies of scale in European settlement and depository systems; see Schmiedel/Malkamäki/Tarkka (2002), Van Cayseele/Wuyts (2005) and Van Cayseele/Wuyts (2006). Besides these studies, others (many of which were produced or commissioned by interested stakeholders) aim at identifying and examining the costs of European securities post-trading activities:<sup>35</sup> Lannoo/Levin (2001), Giovannini Group (ed.) (2001), London Stock Exchange/Oxera (eds.) (2002), AFTI/Eurogroup (eds.) (2002), Deutsche Börse Group (ed.) (2002) and Euroclear (ed.) (2003) focus on CSD/ICSD-related costs, while Morgan Stanley/Mercer Oliver Wyman (eds.) (2003), NERA Economic Consulting (ed.) (2004) and Deutsche Börse Group (ed.) (2005a) also take into account CCP-related costs. Regarding these studies, the European Commission finds: ‘While useful, none of the results have been universally accepted as providing an accurate description of the prices or costs incurred by investors in acquiring post-trade services in Europe.’<sup>36</sup> Oxera (ed.) (2007), which was thus assigned

<sup>34</sup> Huang (2006), pp. 232–3.

<sup>35</sup> For a comparison and overview of the different cost studies, refer to Scott (2003), pp. 13–16; Schmiedel/Schönenberger (2005), pp. 28–30; and European Commission (ed.) (2006b).

<sup>36</sup> European Commission (ed.) (2006e), p. 1. Also see European Commission (ed.) (07.11.2006), p. 1.



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by the European Commission to close the research gap, developed a methodology to monitor changes over time in prices, costs and volumes of securities trading and post-trading activities (covering services provided by CSDs/ICSDs and CCPs).<sup>37</sup> Despite Oxera’s important contribution, two important research gaps continue to persist: no research to date has been provided on derivatives clearing costs. Furthermore, no comprehensive analysis of both direct and indirect clearing-related costs has been undertaken.<sup>38</sup> Because measuring and isolating indirect costs is a difficult and highly complex task, Oxera’s study does not incorporate indirect costs.

To summarise, the existing research on the industrial organisation of the post-trade industry reveals a major shortcoming: although clearing services provided by CCPs play a crucial role for financial markets integration,<sup>39</sup> there is no comprehensive analysis of the industry structure and efficiency of European CCP arrangements. So far, contributions have focused on CSD/ICSD-related research. Regarding the existing literature on CSDs/ICSDs, Milne (2007) finds that ‘[d]espite the economic importance of this industry it remains under-researched’;<sup>40</sup> the same is even more true for the area of CCP clearing. The scant research on the organisation of CCPs has thus far only been an offshoot of CSD/ICSD-related research. Furthermore, all of these CCP studies concentrate on securities clearing, and exclude aspects relevant for derivatives clearing.

Understanding the industrial organisation of clearing therefore requires a great deal of new work. ‘We need thorough descriptive analysis of the industry . . . so that the profession fully understands the processes and services involved. We need new theoretical models that explore the specific economic features of this industry. We need careful empirical studies that recognize the unique features of the industry.’<sup>41</sup>

1.3 Purpose of study

The purpose of this study is to provide a substantial contribution to closing the aforementioned research gap. To this end, the two core research issues are

<sup>37</sup> Cf. European Commission (ed.) (07.11.2006); and Oxera (ed.) (2007), p. i. The methodology is to be applied for the first time in the second half of 2007, and subsequently in the following three years.  
<sup>38</sup> Refer to section 3.2 for a definition of clearing-related direct and indirect costs.  
<sup>39</sup> Details on the clearing services provided by CCPs and the associated micro- and macroeconomic benefits are outlined in Chapter 2.  
<sup>40</sup> Milne (2007), p. 2946. <sup>41</sup> Milne (2007), p. 2947.

the efficiency of CCP clearing and clearing industry structure. It is the research objective to determine the impact that different cross-border integration and harmonisation initiatives between CCPs have on the efficiency of clearing. For the purpose of this study, these integration and harmonisation initiatives are referred to as ‘network strategies’. The results of this investigation allow conclusions to be drawn with respect to the most preferable future clearing industry structure.

Clear-cut definitions designed to avoid any further confusion about CCP and CSD/ICSD issues, together with a concise characterisation and descriptive analysis of the current state of the clearing industry, set the stage for the following analytical objectives:

- (i) Examine the efficiency of clearing:
  - develop a method to assess the efficiency of CCP clearing;<sup>42</sup>
  - identify, classify and analyse the clearing-related direct and indirect transaction costs that market participants have to bear;
  - generate insight into the nature and dynamics of these costs from the perspective of different market participants;
  - provide a detailed qualitative and quantitative analysis of direct and indirect clearing costs to enable benchmarking to other market infrastructure-related costs, such as trading and settlement.
- (ii) Provide a characterisation of the clearing industry structure:
  - identify and analyse characteristics of the current clearing industry structure.
  - classify archetypes of different network strategies;
  - provide an overview of selected network strategies in the clearing industry;
  - define potential demand- and supply-side scale effects in clearing;
  - collect evidence for the existence of demand- and supply-side scale effects in clearing.
- (iii) Research the impact of different network strategies on the efficiency of clearing:
  - develop an innovative framework for analysis that integrates the perspectives of different market participants and provides a graphical illustration of the complex relationships between economies of scale and scope, and network effects in clearing, their impact on transaction costs and industry efficiency;

<sup>42</sup> The term ‘clearing’ as used throughout this study refers to services provided by CCPs.