Contractual Design and Functions – Evidence from Service Contracts in the European Air Transport Industry

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Abstract

Contracts within governance classes, e.g. alliances or supply chain contracts, display a great degree of variation in contractual design. Different propositions have been advanced on the influence of repeated interactions on contractual complexity. In this paper, we explore the alignment between provisions in functional classes and the underlying transaction attributes. The transaction cost impact of learning via standardization of contract provisions is examined in this context. Evidence from 42 service contracts shows that contracts exhibit both a safeguarding and a coordinating function. Depending on the provision's function, standardization occurs in 'learning arrangements' at the industry-level or at the firm-level. (JEL: L22, L93, D23)

Key Words: Transaction Cost Economics, Contract Design, Contractual Function, Learning, Air Transport.

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1 Introduction

The variety of empirical studies drawing on Transaction Cost Economics (TCE) is impressive. Driven by the archetypical question of vertical integration, early studies explored the make-or-buy decision of firms (e.g. Masten 1984, Teece and Monteverde 1982). Since then hybrids – the third generic governance mode conceptualized in TCE – have received increasing attention, both in qualitative and quantitative industry studies (e.g. Ménard 1996, Oxley 1997, Powell 1996).

Within this third generic governance mode, research on contracts in dyadic supply relationships has a tradition of its own. Early studies have focused on single contractual dimensions such as contract duration (e.g. Joskow 1985, 1987) or the occurrence of contracting terms such as take-or-pay provisions (e.g. Masten and Crocker 1985).

More recently, research has addressed the design of contract in its entirety, often framing the underlying transaction cost trade-off in a dynamic context. The key questions being, how the formation of trust and the impact of learning in repeated interactions affect contractual design, e.g. the contract's level of complexity. In the light of mixed empirical results, academics have proposed to look beyond an uni-dimensional construct of contractual complexity (Eckhard and Mellewigt 2006, Reuer and Ariño 2006). Aggregate measurement constructs of complexity (i.e., through counting the occurrence of terms), run the danger of masking the distinct functions served by individual terms (Reuer and Ariño 2006).

We seek to contribute to the evolving literature on contractual design and functions by focussing on two interdependent aspects in our empirical study. *First*, we explore the alignment between contracting terms in distinct functional classes (safeguarding,

coordinating, and contingency adaptability dimension) with the attributes of the transaction. *Second*, we analyze how learning impacts the design of provisions within functional classes.

In contrast to empirical studies on alliance contracts in the high technology or the manufacturing sector, we draw on a sample of 42 service contracts between a European network carrier and its ramp handling suppliers at airports in the European Union.

The presented qualitative and quantitative evidence corroborates the hypothesized relationship between *contractual safeguards* and conditions of asset specificity in earlier TCE studies. Contract duration, incentive/risk-share provisions and the complexity of the attached Service Level Agreement (SLA) varies significantly with specific investments. Besides a safeguarding function, airline and handlings supplier design contractual elements to facilitate ex-post *coordination,* e.g. outline of responsibilities and tasks in quality assessment procedures. Unique antecedents in the transaction attributes for the provision's design within a functional class could not be detected. Both design dimensions and the underlying transaction cost trade-off are strongly impacted by the reliance on standardized "off the shelf" contracting terms. Airline and handling agents use a unique "learning" arrangement at the industry-level to develop standard provisions with a *safeguarding* and *contingency adaptability* function. *Coordinative* terms, are standardized at the firm-level across transaction with comparable coordination requirements.

The paper proceeds as follows. In section 2 we summarize the literature on contractual design and present our propositions. In section 3 contracting hazards, contract design, and learning arrangements in the handling industry are explored. In section 4 we state econometrical results for the observed variations in distinct contractual dimensions. Section 5 concludes with a discussion of results and outlines future research opportunities.

2 Contractual Design and Functions

Central to empirical studies in TCE is the discriminating alignment hypothesis to which the theory owes its predictive power (Williamson 1991). Market coordination of a transaction results in a comparative cost disadvantage when addressing the following problems in exchange relationships (Rindfleisch and Heide 1997):

(1) Safeguarding problem in the presence of asset specificity

(2) Adaptation problem in the presence of changes in the external environment

(3) Performance evaluation problem in the presence of behavioral uncertainty[1]

TCE argues that each generic governance mode market, hybrid and hierarchy disposes over discrete competencies. According to this structural view, different types of *contract law* – classical contract law for markets, neoclassical contract law for hybrids, and 'law of forbearance' for hierarchies[2] – support each mode. Other governance attributes conceptualized include *incentive intensity* and *adaptation type* (Williamson 1985, 1991). Both dimensions are interdependent: autonomous adaptation via the price mechanism is a pre-requisite for high powered market incentives, while coordinated adaptation within hierarchies requires administrative controls and results in low powered incentives. Hybrid arrangements lie on the continuum between the polar modes and share attributes of both, markets and hierarchies (Williamson 1991).

While the governance decision occurs at an aggregate level and primarily addresses the question of firm boundaries, research on contractual design explores the economic

[1] Ghosh and John (1999) distinguish between two costs associated with performance measurement: the opportunity cost of failure to motivate the right level of effort and the out-of-pocket cost associated with monitoring.

[2] Common elements found in neoclassical contract law are (i) the contemplation of unanticipated disturbances, (ii) definition of absorption tolerance zones, (iii) information disclosure and substantiation, and

rationale of buyer and supplier in the establishment of a contract's terms of trade (James 2000).[3] The design features of a contract determine its position on the market-hierarchy continuum, i.e. whether it shares more or less attributes of market or hierarchical governance.[4] Efficiently designed contracts allow the parties to exploit gains from trade, while economizing on transaction cost.

2.1 Basic Propositions

The transaction cost trade-off in the design of a contract, i.e. its level of completeness, can be expressed as follows (Saussier 2000, p. 193):

> "Setting a side the cost of writing the agreement, the main cost incurred in the search for a more complete contract (as against an incomplete one) will be the information cost, the negotiation cost, and the potential 'maladaptation cost' or 'renegotiation cost' of being trapped in a bad contract [...] the principal gains from a more complete contract (as against an incomplete one) are (i) for the contractant that has developed specific assets, a reduced exposure to the opportunism of the other party; (ii) savings on repeated re-negotiation costs"

Similar to Saussier, most researchers use the construct of contractual completeness as their latent dependent variable. Ariño and Reuer (2004) argue that in the absence of detailed information on the transaction, contractual complexity, rather than completeness, is in most cases a more appropriate construct. In their perspective completeness represents a measure relative to the attributes of the governed transaction, while complexity is a contract design feature per se. Henceforth, our discussion draws on the construct 'contractual complexity', defined as "a design feature of firm's contractual agreements that reflects the number and stringency of provisions employed" (Reuer and Ariño 2003).

(iv) arbitration. In hierarchies conflict resolution is enforced by (management) fiat, as courts "forebear" to hear internal conflict within organizations such as business firms. (Williamson 1985, 1991)

[3] Governance is defined as "alternative institutional modes of organizing transactions" (Williamson 1979, p. 234), where as contractual design determines the "specific exchanges negotiated by trading partners and the allocation of risks and trading gains resulting from them" (James 2000, p. 48).

[4] A more formal line of research has explored the choice between fixed price vs. cost-plus contracts in procurement (Bajari and Tadelis 2001). The authors argue that cost-plus contracts share more attributes of hierarchical governance, i.e. low powered incentives and coordinated adaptation, and thus economize on

The transaction cost trade-off on a contract's degree of complexity resembles the one worked out in prior empirical studies on contract duration (e.g. Joskow 1987, Saussier 1999). Partner to exchange seek stronger safeguards, in form of a more detailed contract, as conditions of *asset specificity* increase their bilateral dependency. At the margin, the cost for designing a more complex contract equals the marginal benefit from the additional protection of quasi-rents[5].

Disturbances in the transaction environment (*environmental uncertainty*), e.g. changes in technology or shifts in demand preferences, result in potential 'renegotiation cost' and 'maladaptation cost' of being locked in a bad contract (Saussier 2000). In consequence parties value the flexibility to fill in the gaps of a less specified contract.

Behavioral uncertainty, conceptualized as the cost of performance measurement, is predicted to increase the contract's level of complexity. Problems of observability and verifiability of a supplier's output quality across an organization's boundary, allows for strategic behavior of the contracting partner. Measuring the supplier's level of effort might either not be feasible or come at prohibitive cost. In order to reduce behavioral uncertainty, contracting partners incur the cost for specifying a more detailed contract, outlining measuring, monitoring, and penalty procedures.[6]

Proposition 1a: *Asset specificity increases the complexity of contracts*

Proposition 1b: *Environmental uncertainty decreases the complexity of contracts*

Proposition 1c: *Behavioral uncertainty, in the form of cost of performance measurement, increases the complexity of contracts*

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transaction cost for highly complex (specific) transactions, which entail a high probability for ex-post renegotiation.

[5] Quasi-rents are defined as the excess of an asset's value over the value of its best alternative use or user (Klein, et al. 1978). This excess of return keeps the asset in its current use, and can include pure rents as well (Holmstrom and Roberts 1998).

[6] Early work in the agency literature makes this proposition (Holmstrom 1979). Gibbons (2005), elaborating on how incentive theory informs contractual design in interfirm relationships, states similar conclusions for performance measurement in the presence of observability problems.

2.2 Dynamic Propositions

In a dynamic setting the outlined transaction cost trade-off on a contract's level of complexity will be influenced by prior experiences as well as future expectations. On the one hand, researchers have proposed that informal safeguards such as trust ("shadow of the past") and reputation ("shadow of the future") act as low cost substitutes for formal contracts.[7] On the other hand, learning in repeated interactions reduces the cost of designing detailed contracts, since parties are able to rely on terms previously used. In addition, contracting parties gain a deeper understanding on the relevancy for ex-/including certain provisions (Argyres, et al. 2006, Argyres and Mayer 2006, Mayer and Argyres 2004). The net effect of informal safeguards (trust and reputation) and learning (standardization of contractual terms) determines whether prior interactions result in a more or a less complex contract (Ariño and Reuer 2004).

One research opportunity resides in the criticism of a uni-dimensional construct of contractual complexity. Researchers employing both, qualitative case studies (e.g. Avadikyan, et al. 2001, Dekker 2004, Klein-Woolthuis, et al. 2005) and econometric tests (e.g. Anderson and Dekker 2005, Reuer and Ariño 2006), convincingly argue that contractual terms are designed to serve distinct functions[8]. As displayed in table 2, most empirical studies fall into first the two classes, which approximate the contract's completeness/complexity by either counting the occurrence of contractual terms or by its type of pricing provision, e.g. fixed price vs. cost-plus contract.

[7] Based on their review of the empirical literature on open-end alliance contracts and contracts with a pre-specified duration (e.g. Luo 2002, Parkhe 1993), Ariño and Reuer (2004) conclude that reputation effects decrease contractual complexity. For a discussion on the role of trust in supply relationships, which is outside the scope of this paper, we point to recent work by Klein-Woilthuis et al. (2005).

[8] Summarizing on the classical contracting literature, Argyres et al. (2006) outline the following functions of a business contracts: (1) align the parties' expectations of each others obligations, (ii) provide incentives to fulfill these obligations, (iii) prevent costly disputes from arising, (iv) provides a basis for resolving disputes

[Table 1 about here]

The third class of studies employs multiple dependent variables, each measuring contractual complexity for provision within a functional class. In the literature several contractual functions have been proposed and labeled differently[9]. In this paper we follow the terminology advanced by Eckhard and Mellewigt (2006), based on the proposition that contracting terms take on *safeguarding*, *coordinating* or *contingency adaptability* function. In particular, they propose that contractual terms have unique antecedents: terms with a *safeguarding function* are aligned to asset specificity, contractual terms with a *coordination function* are aligned with task interdependency, and contractual terms with a contingency adaptability function are aligned with *transaction instability*[10].

Proposition 2: *Contractual design depends on the alignment between provisions with distinct functions and the corresponding transaction attributes.*

If the design of contractual terms within functional classes depends on distinct transaction attributes, a resulting multi-dimensional construct of contractual complexity might also reveal the more subtle trade-offs in a dynamic setting.

Safeguarding provisions, e.g. unilateral termination rights or variation in contract duration, are designed to restrict opportunistic behavior and to outline procedures, e.g. penalty payments, in case of contract breach. *Contingency adaptability provisions* outline procedures and responsibilities in case unanticipated states of nature materialize. The

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that arise despite best efforts, whether the disputes arise from opportunism or from honest misunderstandings.

[9] Examples include Anderson and Dekker (2005), distinguishing between the dimensions assignment of rights, product and price terms, after sales service, and terms of legal recourse; Ariño and Reuer (2006), identifying provisions with either an enforcement or coordinating function; Argyres et al. (2006), assigning provisions to the dimensions task description or contingency planning.

[10] 'Transaction instability' is equivalent to the more commonly used term 'environmental uncertainty'.

subtle distinction between the two functions being, that safeguarding provisions allocate rights and obligations at a more general level, while contingency provisions explicitly outline actions in case of a specified contingency.

One would expect contracting parties to rely on previously and successfully used terms (boilerplate terms) in case contractual hazards and environmental disturbances are relatively constant. Transaction cost saving through the use of standardized terms might occur both across contracts with different suppliers (firm-level) and over time with the same supplier (transaction-level).

Proposition 3a: *Contractual terms with safeguarding and contingency adaptability functions are repetitively used in case contractual hazards and environmental disturbances are well-known from prior experiences.*

Terms, describing tasks, responsibilities or timelines, but also attached business plans take on a *coordinating function* in contracts. Common attributes of coordinating terms are their informational character, their objective to align expectation ex-ante, and their limited enforceability in court. Furthermore, these contractual elements tend to be fairly technical, requiring detailed knowledge of the people, e.g. managers or engineers, designing these terms (Argyres and Mayer 2006). For novel transaction, e.g. a new supplier contract in the context of a product innovation, coordinating provisions have presumably little overlap with existing experiences. For recurring transactions with fairly comparable coordination requirements, we would still expect the emergence of boilerplate terms with a coordinating function.

Proposition 3b: *Contractual terms with a coordinating function are repetitively used in case transactions are comparable in their coordination requirements.*

3 Design and Functions of Service Contracts in Air Transport

Our qualitative and quantitative analysis on contractual design draws on a sample of 42 ramp handling contracts between a large European Network Carrier (hereinafter referred to as NC) and its ramp handling suppliers[11]. The data has been gathered in a series of expert interviews with NC's procurement managers and handling suppliers, levied in a survey[12], and supplied by NC.

The transaction 'ramp handling services' primarily includes the (un)loading of the aircraft, the operation of handling equipment, and the transportation of passengers and baggage from the aircraft to the terminal. Handling companies are involved in two major transactions. The first transaction takes place in the upstream market between ground handler and the airport operator for the usage of central infrastructure facilities (CP#1 in *figure 1*) [13].

[11] The Carrier maintained 70 contracts with its different ramp handling suppliers at airports in the European Union in December 2005. Due to the following reasons we have excluded 28 contracts from our review: 5 contracts have been influenced by prior disinvestments, 22 contracts have been negotiated with monopoly handling suppliers, and for another 3 contracts we were unable to obtain reliable data.

[12] In the data exploration stage, we have employed a three step approach to improve the accuracy of these retrospective reports (Huber and Power 1985). In the *first* stage the survey has been developed and pre-tested by conducting semi-structured interviews with airline purchasing managers and handling agents. Incorporating the insights obtained in theses interviews; we have modified the questionnaire and re-checked for accuracy with the interviewees. In a *second* step we have distributed a questionnaire on each contract to the airline purchasing managers in charge of the account. We received 67 valid responses from 70 initially distributed surveys. All purchasing managers of the HSC can be assumed to be knowledgeable as they are involved in the development and maintenance of the supply relationships on a regular basis. When feasible, we identified the purchasing manager, who had been in charge of the account at the time the contract was negotiated. The level of personal influence on the contracting decision was confirmed with a control question (mean at 5.80 on a seven-point Likert scale). In a *last* step we interviewed a second group of handling agents and two senior purchasing managers of alternative European network carriers, applying a slightly adapted survey design. The intention was to contrast the handling agents' evaluation with the perspective of the purchasing manager, as well as to capture additional information on contracting practices of other airlines. The perspectives corresponded, pointing to a small bias of the sole inclusion of the procurement side in the survey.

[13] Assets with essential facility character in the case of ramp handling consist of the baggage sorting system, de-icing plant, and water purification system. The *Directive 96/67/EC on access to the ground handling market at community airport* states that the complexity, cost or environmental impact of these assets do not allow division or duplication (Council Directive 1996, Article 8). In the presence of a forward integrated

[Figure 1 about here]

The second transaction, which is subject to our empirical analysis, takes place between airline and ramp handler in the downstream market (CP#2 in *figure 1*). The variety of observed governance arrangements in the European handling market, ranging from short-term to long-term contracts and backward integration of airlines (self-handling), turns the industry into an interesting subject for a TCE-based study..

In most European countries the national hub-and-spoke carrier has traditionally internalized its ramp handling activities at its national hub and large secondary airports[14]. At smaller spoke airports, however, ramp handling services are usually procured from an outside supplier. Related TCE-based studies in air transport (Fuhr and Beckers 2006, Langner 1995) have argued that contracting hazards and coordination requirements depend on the contracting location in the airline's network. The variation in transaction attributes results in specialized governance arrangements between hub carrier and its suppliers at the respective hub airports and – to a minor degree – at large secondary airports.

The set of contracts subject to our analysis offers a unique research opportunity, since institutional constraints have forced NC to contract out its ramp handling activities at its national hub and secondary airports prior to deregulation in 1996[15]. In line with

airport handler, the discriminate-free access to these facilities have been extensively treated in the literature (see Kunz 1999, Wolf 2003, pp. 284-298)

[14] The term secondary airport borrows from a classification by Hirschhausen, et al. (2004). Secondary airports are situated in large catchment areas, provide a large portion of the HSC network feeder traffic, and attract point-to-point traffic. Examples include Marseille (Air France), Manchester (Bristish Airways), and Hamburg (Lufthansa German Airlines).

[15] One can distinguish between three types of handling suppliers: (i) airports, which also compete in the handling market, (ii) self-handling airlines, and (iii) independent handlers. NC had been exposed to monopoly airport handling companies in its national market. In the year 1996 the European Commission passed the *Directive 96/67/EC on access to the ground handling market at community airports* in 1996. Based on vested interest and the resulting ex-ante political agreement, the Commission opted for a gradual introduction of competition (Soames 1997). In consequences substantial constraints on the contracting and organizational decision continue to be in existence in most European countries (Fuhr 2006).

propositions on institutional constraints (Fuhr 2006, Ménard and Yvrande-Billon 2005) and governance inseparability[16] (Argyres and Liebeskind 1999), NC has maintained its 'contract interface' with its ramp handling suppliers up to the time of this study. However, we expect contract design to reflect the variation in contracting hazards between the different contracting locations in its network.

3.1 Contracting Hazards and Coordination Requirements

a) Asset Specificity

A network carrier disposes over significant market shares at its hub and secondary airports, as it exploits economies of density and scope via its hub-and-spoke network structure[17]. Large market shares at specific airports in its network result in an asymmetry condition in the local demand for ramp handling services and triggers investments in *dedicated* handling equipment and staff. Even though handling equipment is standardized, a handling supplier cannot readily re-employ a large number of handling equipment with a different airline customer. According to industry participants, secondary markets are only able to absorb a limited number of equipment. Following TCE's predictions, an alternative handling supplier would request special (contractual) safeguards prior to investing in dedicated equipment, hiring new staff and expanding its local maintenance facilities.

Next to dedicated asset specificity, quasi-rents are generated over time through the build-up of *human capital assets* via formal training of staff and via learning-by-doing. As handling agents accumulate know-how about the respective airline's processes and flight schedule at the resource-disposition and at the work-floor level, she is able to increase the

[16] Governance inseparability, defined as "a condition in which a firm's past governance choices significantly influences the range and types of governance mechanisms that it can adopt in future periods" (Argyres and Liebeskind 1999, p. 49) constitutes a weak form of path dependency.
[17] In a hub-and-spoke network, economies of density and scope are exploited by bundling traffic at a central hub airport (Brueckner and Spiller 1994, Caves, et al. 1984).

quality and productivity in operations. These human capital assets will be lost in case of a supplier change. For the operations at a small spoke airport the drop in handling performance is temporary limited, since the required human capital to support the productivity level is small. A supplier change at an airline's hub airport or outsourcing a self-handling operation would result in a substantial loss in handling quality. As quality problems at a central airport, in particular delays incurred in handling processes, impact the overall network performance, the loss in handling performance is highly consequential for an airline. The size of accumulated human capital assets involved in handling a network carrier at its secondary airports is moderate. However, a carrier would still expect a substantial quality drop as a new handling supplier requires time to generate the necessary human capital assets during the start-up phase of the carrier's operations (approximately 6 to 12 months).

b) Uncertainty

Environmental uncertainty and the need for coordinated adaptation, e.g. contract re-negotiation, appear limited for ramp handling transactions. Both, airline procurement managers and handling agents have stressed that re-negotiation of the entire contract is an exception. Based on our initial sample of 67 contracts in the European Union, the great majority of contracts (82.2%) have not been re-negotiated. In case re-negotiation occurred, NC's commercial managers indicated that changes to the contract were minor and hardly affected the contract's perceived value. In contrast to other more dynamic environments the necessity to adapt to external disturbance is limited in the handling market, as demand uncertainty is comparatively small, production technology is well established, and strong safety and security regulations limit innovation.

A second source of uncertainty arises in the form of *behavioral uncertainty*, since measurement of the handler's provided quality level comes at a cost. A key quality dimension is the performance of the ramp handling service in a pre-specified time window according to the airline's schedule. Furthermore, network carriers expect the handling agents to initiate extra effort to make up for existing delays of incoming aircrafts. Cost of ex-post monitoring and enforcement activities of the contracted quality level are influenced by the complexity of ground handling processes at the respective airport. At large hub airports and congested secondary airports, for example, the assignment of delay to the handling supplier is difficult. Ground handling processes are strongly interdependent and many dimensions exists in which things can go wrong, e.g. air traffic control, fuelling services, weather conditions, and special transfer processes. Failure to motivate the right level of effort of the ramp handling supplier at a hub airport or at a large secondary airport is consequential; in particular as delays propagate through the entire network.

3.2 Contractual Design and Functions

In the following, we explore how NC and its handling suppliers have responded in terms of contractual design to the outlined variations in transaction attributes. A first striking observation is the significance of standardized contracting elements in this industry. Standardization is achieved through a worldwide contracting standard: the Standard Ground Handling Agreement (SGHA). The SGHA provides the basis for most contracts in the industry and is developed between handling agents and airlines under the sponsorship of the International Air Transport Association (IATA)[18].

[18] The International Air Transport Association (IATA) was founded in 1945 and represents 260 member airlines. In contrast to its early role of coordinating tariffs, it seeks to act as a facilitator in the air transport industry today.

> "The Aviation Ground Services Working Group […] is responsible for the Aviation Ground Services Agreement (SGHA), which forms a "model" contract for the provision of ground handling services […] The Members of the AGSA/WG are highly seasoned managers representing IATA carriers and ground handling companies. The agreement is changed every five years and the working group meets on a regular basis each year in preparation for this change. As part of its work programme, the working programme liaises with other industry activities e.g. IATA Legal Advisory Committee and Risk and Insurance Managers Panel. Changes to the SGHA must be approved by the full IATA Ground Handling Council and IATA Airport Services Committee" (www.iata.org)

Industry participants have created a sophisticated institutional arrangement, which allows them to incorporate past learning experiences and adopt boilerplate terms at an industry-level. As a result of an accepted contracting standard, handling agents and airlines are able to economize on transaction cost as (i) contracting takes place between commercial managers and with limited interference of legal staff and (ii) the standard terms establish mutually accepted parameters based on prior experiences.

In order to understand the motivation for NC and its suppliers to deviate from the industry standard terms, we briefly outline the purpose of the different contracting documents used in a standard contracting process:

(1) The *Main Agreement* states the standard contracting terms.

(2) *Appendix A* lists a coded menu of services and sub-services (see appendix 1 for an example for the sub-service 'moving of aircraft')

(3) In *Appendix B* parties agree on the sub-services subject to the contract (based on the coding in Appendix A), state the prices per handling event for each aircraft type, fix deviations from the standard contracting terms, and include custom contract clauses.

(4) The *Service Level Agreement (SLA)* is usually attached to Appendix B and describes the contracted quality level for services and sub-services. In addition, a description of measurement processes, a quantification of penalty payments, or

an outline of local procedures between the local airline station manager and the handling manager might be included.

Contract design occurs exclusively in Appendix B and within its attachments, in particular the Service Level Agreement.[19]

Based on the interviews with NC's purchasing managers and a review of NC's contracts, three main sources of deviation in contractual design have been encountered: (i) contracts, based on the SGHA standard, display different deviations from standardized terms and include customized clauses; (ii) in a few occasions (9 out of 42 contracts) NC and its handling supplier have drafted contracts outside the SGHA standard; (iii) the attached service level agreements differ in their degree of standardization, scope, and term specificity. In addition, we discuss observed variations in governance arrangements, in which contract enforcement and the transaction's coordination takes place during the contract execution period.

In the following, we focus on whether (i) the deviation from the standard terms and (ii) the complexity of negotiated service level agreement are interrelated with the proposed variation in contracting hazards (*proposition 1*). We explore whether terms are aligned with different transaction attributes according to their function (*proposition 2*) and if the emergence of boilerplate terms is related to their function (*proposition 3*).

a) Deviation from Standard Terms

The contracts in the sample have been reviewed for provisions suggested in previous studies (Eckhard and Mellewigt 2006, Parkhe 1993, Ryall and Sampson 2003, Saussier

[19] The contracting parties state this in the preamble of the Annex B: "This annex B is prepared in accordance with the simplified procedure whereby the parties agree that the terms of the Main Agreement and Annex A of the SGHA of AHM810 January 2004 as published by the International Air Transport Association shall apply as if such terms were repeated here in full. By signing this Annex B, the parties confirm that they are familiar with the aforementioned Main Agreement and Annex A"

2000). The provisions encountered include (i) arbitration/ law suit provision, (ii) contract duration provision, (iii) uni-lateral termination provision in case of supplier under-performance, (iv) confidentiality clause, (v) auditing rights for process standards, (vi) monitoring rights in form of supervision of supplier's operations, (vii) bilateral re-negotiation rights in case of change in the airline's schedule, (viii) price indexation, and (ix) incentive/risk- sharing provisions for changes in traffic volume or aircraft mix. In a *second step* we have assigned either a safeguarding, coordinating or contingency adaptability function to the individual provision. *Third*, we have classified the provision according to their degree of standardization: industry-level, firm-level, or transaction-specific. In case standardization occurred at the industry-level, we state the year when either the provision has been adopted in the SGHA or the standard provision has been changed significantly. All provisions contained in the standard contract prior to 1993 are designated with the year 1988.[20] Table 2 summarizes our findings. The standardized provisions and examples for deviations are listed in Appendix 2.

[Table 2 about here]

Safeguarding Provisions. Among the provisions with a safeguarding function, *contract duration* is the main source for variation in NC's contract. While the SGHA standard term on contract duration permits the parties to terminate the agreement with prior written notice of 60 days, this right is waived in the majority of cases and replaced with a fixed

[20] According to the interviewed experts from the IATA Working Group the year 1988 marks a landmark change in the standard's history. European national flag carriers, most of them being monopoly handling supplier, initiated the standard in 1958 with the objective to facilitate the reciprocal exchange of handling services. The liberalization of air transport and a large shift to outsource handling activities resulted in independent handlers gaining significant market share in the 80's. Thus starting with the year 1988

duration (mean at approximately 2 years, minimum at 60 days, maximum at 7 years). A second source of deviation from the SGHA terms is the inclusion of a boilerplate term, granting NC's the *unilateral right for early termination.*

> "if in the opinion of the carrier the handling company fails to provide a consistently satisfactory level of service, the Carrier reserves the right to provide the Handling company with written notice to the effect that correction is required within 30 (thirty) days. If the handling company fails to correct the situation within 30 (thirty) days, the carrier may terminate the Agreement upon an additional 30 (thirty) days prior written notice."

All remaining safeguarding provisions (*confidentiality*, *monitoring rights*, and *auditing rights)* are standard industry terms and are left unaltered in NC's contracts. These terms were developed in the standard setting arrangement and included in the revision of the standard contract in 1993 and 1998. The development of the *arbitration and law suit provision* has taken an opposite development. Prior to the 2003 SGHA standard, the standard arbitration provision obliged the parties to seek arbitration and outlined in detail procedure to do so. Since airlines and handlers waived the arbitration term in the great majority of contracts, the provision was changed in 2003 (now arbitration is named as an optional alternative to addressing a public court).

Contingency Adaptability Provisions. Within the standard contract, a *bilateral re-negotiation right* is granted in case the carrier's traffic volume or schedule changes. The term forms part of the standard contract since 1998 and has not been waived in a single occasion in NC's contract. A few contracts contained customized *incentive/risk-sharing provisions*, stating a threshold value in terms of flight movements or sales. Some contracts (14 out of 42) include *price index provisions*, tying prices to RPI development. This term is included in the majority of revolving short-term contracts, presumably with the intention to economize on re-negotiation costs.

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independent handling supplier have joined the currently observed institutional arrangement for standard setting under IATA sponsorship.

The analysis on the 33 contracts relying on the industry contracting standard, displays that both parties draw heavily on boilerplate terms to economize on transaction cost. The threat of misappropriation, e.g. through shirking (inferior handling quality) or opportunistic early termination by the carrier, is addressed via variations in contract duration in combination with the unilateral early termination provision.

A limited impact of environmental disturbances is corroborated as NC and its suppliers usually do not design customized provisions with a contingency adaptability function, but rely on the standard industry clause.

b) Contracts outside the Industry Standard

Some contracts (9 occasions), negotiated in NC's national market, do not rely on the industry standard. With the exceptions of contracts at NC's hub airports, which display a higher degree of customization, these contracts draw on a standardized contract developed by NC and its national suppliers. In comparison to the contracts based on the SGHA standard, the following differences have been observed:

- Long *contract duration*, often paired with a prior termination notice between 6 to 12 months.
- Other safeguarding provisions such as *uni-lateral early termination right*, *arbitration/ law provision*, *confidentiality provision*, *monitoring rights*, *auditing rights*, and *bilateral renegotiation provision* are not included.
- Almost all contracts include customized provision with a contingency adaptability function (*incentive/risk-share provisions*), addressing NC's fluctuation of traffic or its aircraft mix.

According to the interviewed company lawyer, the explicit inclusion of safeguarding provisions in national contracts, e.g. unilateral safeguarding provision for underperformance, is not necessary as national statuary law covers these aspects. Long-term contracts paired with extensive up-front termination are perceived as safeguards to both parties, since a potential supplier change at these airports requires an extensive up-front preparation.

c) The Functions of Service Level Agreements

The provisions contained in the contract's main body display a large degree of standardization either at the industry- or at the firm-level for national contracts. Provisions with a *coordinating function* have not been encountered in the contract's main body. Except for contracts at its hub airports, the length of the typical contract's main body ranges from 3 to 6 pages. The attached Service Level Agreements, on the other hand, vary substantially: most SLAs consist of a simple 1 to 2 page spreadsheet, others of detailed specifications up to 35 pages. These differences arise as the scope and term specificity varied in the following dimensions:

- Objectives and a mutual understanding for designing the SLA.
- Process description, quality levels, and qualification of staff and equipment.
- Measurement process, frequency of spot checks, and data sources.
- Penalty payment scheme for underperformance.
- Roles, responsibility and timelines for the measurement process, the agreement on penalty payments, and the resolution of quality problems.

Based on the SLA's complexity, its provisions' function, and its degree of standardization, we were able to allocate the SLAs into one of three following classes.

(1) *Short and highly standardized SLAs* were encountered at smaller spoke airports in NC's network. The negotiation of the SLA takes place between the handling supplier, procurement manager, and the local airline station manager. The quality parameters listed in these short agreements are standardized and of a highly technical language. Only very few elements in the agreement are adjusted to reflect local production processes. Roles, responsibilities, and data sources in the measurement process are not outlined in detail. The SLA requires local station manager and handling supplier to meet on a quarter-year basis to determine penalty payments for underperformance. Some SLAs state a tolerance zone, in which the handler is permitted to resolve quality problems.

> "the monetary settlement will be done quarterly. On a one-time it is possible to suspend the quality penalty payment and to agree on measures between NC's station manager and the Handling Company to improve the compliance rate of the service delivery standard within one month up to the target degree"

According to the interviewed procurement managers, NC's station managers and the local supplier coordinate on an ad-hoc and autonomous basis. The SLA is only being drawn on if quality problems consistently persist. NC's manager stated that the SLA standard template used at spokes airports is discussed and revised in regular intervals. The objective in this standard-setting procedure is to define the key performance criteria, while limiting the required local resources spend on monitoring.

(2) *Long and moderately standardized SLAs* were attached to contracts negotiated at airports with a significant traffic volume of NC (mostly secondary airports). In comparison to first class of agreements, SLAs in the second category span up to

20 pages. The mutual understanding and purpose for crafting a detailed agreement is usually outlined in the agreements.

> "Major goals of this program is to mutually secure a quality standard laid down in this annex and ensure a continuous improvement throughout the entire ground handling process […] in case of discrepancies between the agreed degree of compliance and the fulfilled degree of compliance during the pilot phase both parties agree to mutually investigate the handling process […] both parties agree to mutually evaluate the framework of the programme at the end of a contractual year in order to avoid disproportions."

Both, NC and handling agent align expectations by describing the measurement process, fixing (i) data sources, (ii) responsibilities for measurement, (iii) criteria for validity of measurement, and (iv) intervals for joint meeting and participants for discussing weaknesses and joint actions for improvement. Based on the collected information from designated data sources, a standard formula is specified to compute the penalty payments. Compared to the simple parameters based on subjective performance measurement outlined in short SLAs, contracting parties rely heavily on spot checks and data obtained from their IT-systems. Even though the actual parameters and procedural aspects are fixed in the negotiation process, NC and its supplier rely on a template, outlining standard dimensions. NC's procurement managers stated that the current SLA standard has been developed once, but is not subject to review on a regular basis.

(3) *Customized SLAs* are attached to contracts negotiated at hub airports. These documents range from 20 to 35 pages and described in detail the entire handling process chain at the respective airport. Performance parameters the form of time tags for each sub-processes are specified. In addition to the parameters stated in the typical SLA at secondary airports, input factors, e.g. staff per sub-process or aircraft, are named and measured via spot checks. Strong references are made to

IT-systems for coordinative requirements between the parties as well as for measurement purposes. At both hub airports penalty schemes are complex, describing in detail the validity conditions and procedural aspects.

In our perspective the attached Service Level Agreements take on a *coordinating* and a *safeguarding* function. Airline and handling agent align expectations ex-ante and create a basis for ex-post coordination, e.g. joint action in case of quality problems. The fact that a significant number of SLAs goes through an initial pilot phase or is finally negotiated after the handling contract is actually signed, supports this proposition. On the other hand, a more detailed description of performance parameters in combination with penalty payments render stronger safeguards (incentives) to restrict shirking of the handling agent, respectively unjustified claims for quality improvement by the carrier.

The variation in complexity in terms of scope and term specificity provides first qualitative support for the proposed transaction cost trade-off. Handling transaction with significant asset specificity and cost of performance measurement (at hub and secondary airport) displayed far more detailed Service Level Agreements.

d) Monitoring and Enforcing Institutional Arrangements

Contract duration, incentive/risk-share provisions, the SLA's level of complexity, and learning processes for standard-setting purposes vary in line with differences in transaction attributes. In the course of our investigation we observed governance arrangements, which complemented the formal contract. In these arrangements contract enforcement and coordination in the supply relationship takes places.

At *spoke* airports, NC's station managers take on a central role in enforcing the contracted quality level and resolving coordination problems. At 40 out of 42 contracting

locations, NC is represented by a local station manager[21]. Procurement managers argued that a good relationship quality between station manager and local handling manager suffices to address quality problems on an ad-hoc basis.

At *secondary airports* in NC's network, local functional teams supported by dedicated staff at NC's headquarter are involved in monitoring the respective handling agent's quality level. NC's local staff is considered to be the primary interface to address quality problems and assist in their resolution. The arrangements observed can be considered a form of *"semi-formal" governments*[22]. In these arrangement handling quality is enforced and joint action is coordinated in regular reviews on the basis of jointly collected performance data. In contrast to contracts signed at smaller spoke airports, NC's procurement managers stated that some issues require their personal involvement during the contract execution period.

At NC's *hub airports* coordination and contract enforcement occur in both, *formal* and *semi-formal governments.* At one location, the handling contract is embedded in a joint venture between NC and the airport. At the second hub airport, regular meetings at vice-president level and occasional meetings at the board level take place between NC and the airport handling company. According to NC's procurement managers, the objectives of these meetings vary as both, strategic issues (coordination) as well as pending conflicts are addressed and decided up on. At both airport locations dedicated departments in NC's organization have been established to monitor quality, coordinate with the handling supplier, and serve as knowledge repositories. In contrast to the remaining contracting locations in its network, NC and its handling suppliers have created a joint organizational

[21] The same analysis, drawing on the full sample of NC's contracts, i.e. also including airports with a small traffic volume, the percentage of NC's station manager drops significantly (51 installed station mangers at 67 contracting locations)

unit at the hub airports – a hub control center (HCC). In the HCC employees of NC and its handling suppliers are co-located and have joint access to the parties' operational IT-Systems. The objectives of this arrangement are several-fold: (i) anticipation of potential quality problems, (ii) ad-hoc coordination of action to resolve quality problems, and (iii) assignment of delays to the responsible party.

4 Empirical Results

4.1 Methodology and Model specifications

Building on our qualitative analysis, we test the proposed relationships between transaction attributes and three distinct dependent variables: (i) contract duration (safeguarding function); (ii) occurrence of incentive/risk-share provision (contingency adaptability function); and (iii) complexity of the SLA (coordinating and safeguarding function).

a) Contract Duration

In line with prior theoretical and empirical work, contract duration is assumed to be a linear function of asset specificity and uncertainty (Joskow 1987, Saussier 1999). The dependent variable DURATION is measured by the number of days for which NC and its ramp handling supplier have fixed the contract at airport i. Ordinary Least Square (OLS) Regression analysis is employed to test the proposed relationship. We expect *asset specificity* and *behavioral uncertainty* to increase contract duration, while a rise of *environmental uncertainty* is expected to decrease DURATION.

[22] We consider the arrangement as "semi-formal" as the structure, processes, and the subset of decision are not outlined in detail in the formal contract.

b) Incentive/risk-share provision

The majority of contracts in the sample rely on a standard industry clause, granting bilateral re-negotiation rights in case of significant traffic fluctuations. In a few contract, we have observed customized incentive/risk-share provisions, linking prices to NC's traffic development. The binary variable CONTPROV is coded 1 for contracts, containing a customized provision.

c) Complexity SLA

Three classes of SLAs have been identified based on the level of complexity and term standardization. We use two slightly distinct dependent variables to assess the SLA's complexity. COMPLEXITY_BIN is a binary variable, which takes on the value of 0 for short and highly standardized SLAs and the value of 1 for more complex SLAs. COMPLEXITY_ORD further distinguishes in the latter class between complex, but standardized SLAs and customized SLAs encountered at hub airports.

4.2 Explanatory variables

Asset specificity is operationalized with a corresponding proxy variable for dedicated and human capital asset specificity (MSHARE and TSHARE). DELAY is the proxy variable for behavioral uncertainty (cost of performance measurement), while the variable VOLATILTIY approximates the degree of environmental uncertainty.

$$DURATION_i = a_0 + b_1 MSHARE_i + b_2 TSHARE_i + b_3 DELAY_i + b_4 VOLATILITY_i + u_i$$

$$CONTPROV_i = a_0 + b_1 MSHARE_i + b_2 TSHARE_i + b_3 DELAY_i + b_4 VOLATILITY_i + u_i$$

$$COMPLEXITY\_BIN_i = a_0 + b_1 MSHARE_i + b_2 TSHARE_i + b_3 DELAY_i + b_4 VOLATILITY_i + u_i$$

$$COMPLEXITY\_ORD_i = b_1 MSHARE_i + b_2 TSHARE_i + b_3 DELAY_i + b_4 VOLATILITY_i + u_i$$

The measurement and the intuition for these determinants of our dependent variables are as follows.

- Specific investment in handling equipment and personnel (MSHARE): Handling equipment is standardized and can be re-employed with the same or similar aircraft type of an alternative customer. If a single airline disposes over a large market share, the equipment employed to handle the airline's fleet turns into a dedicated asset. The higher the airline's market share (MSHARE) at airport i, the larger the mutual dependence between handling agent and airline. The volume of the carrier (VOLUME) is measured in take-offs per year, while the size of the local handling market (APSIZE) is corrected for the volume of self-handling airlines (VOLUME_SELF).[23]

$$MSHARE_i = \frac{VOLUME_i}{APSIZE_i - VOLUME\_SELF_i}$$

- Carrier-specific human capital assets (TSHARE): The interaction of handling supplier and airline in the contract execution period results in the build up of human capital assets. Our proxy for the build up of this asset at the resource disposition and the work-floor level is the percentage of transfer passenger of the carrier's total number of departing passenger at contracting location i. The intuition being that transfer processes are highly complex and their optimization result in a build-up of human capital assets via learning-by-doing.

- Cost of Performance Measurement (DELAY): Typical for a service, production and consumption occur simultaneously in ramp handling. The on-time departure of its aircrafts is one of the most important quality dimensions for an airline. Next to

industry-wide safety standards and compliance with governmental security regulation, the handling supplier's performance is evaluated by her ability to handle the aircraft in time. However, measurement and the causal assignment of delays to the responsible party are not trivial as a wide variety of factors influence on-time performance at an airport. High level of delays incurred by the carrier at contracting location i increase the complexity of ground processes and thus the cost of performance measurement. The proxy DELAY is obtained by division of the total minutes of delay incurred by the carrier at airport i (DELAY_TOTAL) through the number of take-offs (VOLUME).

$$DELAY_i = \frac{DELAY\_TOTAL_i}{VOLUME_i} \times 100$$

- Environmental Uncertainty (VOLTATILITY): We have argued that parametric changes in the environment of ramp handling are limited. Demand uncertainty in the form of fluctuation in the airline's traffic volume, however, will affect the handler's productivity level. For the computation of VOLATILITY we draw on monthly data on the number of take-offs of the carrier at location i in the period 2004-2005. The variation coefficient for this period is obtained by dividing the standard deviation (VOLUME_STDEV) through the mean (VOLUME_AVG).

$$VOLATILITY_i = \frac{VOLUME\_STDEV_i}{VOLUME\_AVG_i}$$

In addition to these determinants, we introduce three dummy variables to control for prior interactions and institutional constraints in the handling market.

[23] The adjustment renders a more precise measure of the carrier's significance for the "contestable" market from the handling supplier's perspective.

- Prior relationship (EXISTING): We coded this variable with 1, if the current contract at location i replaced a previous contract with the same supplier.
- Early liberalized countries (EARLYLIB): At airports in countries, which have liberalized their ramp handling markets prior to the EU Directive market access is not restricted. The variable LIBERAL takes the value of 1 for these contracts.
- Licensing Constraint (LICENSE): In some institutional environments, handling suppliers are obliged to apply for an operating license in revolving 7-year intervals. In case the contract has been negotiated within three years of the renewal date of the license, we coded the dummy variable LICENSE with the value one.[24]

Table 3 summarizes the sample statistics (n=42) and the correlation coefficients of our dependent and independent variables.

[Table 3 about here]

4.3 Estimation Results

Table 4 displays the results of our estimations. In line with previous work on contract duration in the ramp handling market (Fuhr 2006), the inclusion of the dummy variables for institutional constraints (LICENSE) and the stage of liberalization (EARYLIB) in model (2) raises the explanatory power significantly by 0.14 to 0.63 in the adjusted R^2.[25] Both dummy variables are significant, reducing contract duration by 645 days, respectively

[24] Each coding has been validated with the responsible purchasing manager for the respective account, asking them whether the upcoming license renewal had been considered in the negotiation process.

by 293 days. The proxy variables for dedicated asset specificity, cost of performance measurement, and environmental uncertainty are significant and display the predicted effect on DURATION[26].

[Table 4 about here]

The decision to design a customized incentive/risk-share provision (CONTPROV) is significantly related to NC's market share (MSHARE) and adversely related to a previously existing relationship (EXISTING) with the supplier at airport i. Hence a new supplier faced with investments in dedicated handling equipment and staff is likely to incur the cost of negotiating such a provision. The proxy for environmental uncertainty (VOLATILITY) is non-significant. The proposition of uncertainty as an antecedent for contingency adaptability provisions is not supported in our empirical context.

Model (4) and (5) display almost identical results. In both cases the SLA's complexity is related to the proxies for asset specificity – the carrier's market share (MSHARE) and the percentage of transfer passenger (TSHARE). Traffic volatility (VOLATILITY), cost of performance measurement (DELAY) and a previous contract with the supplier (EXISTING) display a non-significant effect on the SLA's complexity (COMPLEXITY_BIN, COMPLEXITY_ORD). There are several potential explanations. EXISTING approximates the effect of prior interactions at the transaction-level, i.e. the previous supply relationship at location i. In case the SLA's complexity depends on the identified learning arrangement at the firm-level for handling transaction with similar

[25] We also included the dummy variables EARLYLIB and LICENSE in the remaining model specifications. As both variables proved to be non-significant these alternative specifications are not presented.
[26] Multi-colinearity is in the acceptable range for the variables employed in the OLS Regression (Highest Variation Inflation Factor (VIF) at 2.25)

attributes, EXISTING will not be able to capture this effect. The same argument can be transferred to reputational affects, which might also depend on the relationship between NC and its supplier at other airports in the network. The non-significant impact of uncertainty might result from the employed proxy for human capital asset specificity. If behavioral uncertainty is conceptualized as complexity[27], the share of transfer passenger at an airport might also be an adequate proxy for uncertainty. Put differently, one would expect parties to limit complexity (behavioral uncertainty) by designing more detailed SLAs at locations with significant transfer quotas, i.e. hub airports.

5 Discussion

Design of provisions within functional classes and the impact of learning on contractual design are evolving fields of research. Our aim has been to contribute to these streams of literature by discussing recent propositions and by presenting evidence from 42 service contracts in the air transport industry. Both, the exploration of provisions/attachments in their entirety and the usage of standardized contracting terms (learning) revealed the subtle transaction cost trade-off in the contractual design decision.

Our main results corroborate the findings in earlier TCE studies on the relationship between *contractual safeguards* and the level of specific investment. *Contract duration* has been shown to vary with investment in dedicated assets, the level of environmental uncertainty and the cost of performance measurement. In a second contractual dimension, NC and its supplier varied the *complexity of the attached Service Level Agreement.* Next to a *safeguarding* function, the SLA also facilitates *coordination* across organizational

[27]Argyres and Mayer (2006) argue that a transaction's complexity is a superior construct for assessing uncertainty due to human's 'limited understanding of nature'. Complex transaction involve knowledge sets of multiple individuals and result in the design of more detailed agreement in order to reduce complexity.

boundaries. More detailed SLAs, outlining procedural aspects, roles, and responsibilities, serve to aligned expectations ex-ante and provide guidance ex- post.

The proposition on unique antecedents for the contractual design of provision in functional classes (safeguarding, coordination, and contingency adaptability function) could not be supported. Asset specificity displayed a dominant impact on the observed variation in all analyzed provisions. Furthermore, a clear separation based on functionality proved to be difficult in our empirical context, e.g. more complex terms in the SLA also serve as a safeguard (for the handler shirking and unjustified demands for quality by NC).

An isolated focus on the contemplated variation in the provisions would provide a distorted picture of the involved transaction cost trade-off, if the parties' contract design decision had not been placed in a dynamic context (in our case learning to contract). Well-known contractual hazards and a stable transaction environment in our industry result in the heavy use of "off the shelf" contractual terms at most airport locations. A unique institutional arrangement for standard setting in the handling industry allows both, airlines and suppliers to economize on transaction cost. The identified industry learning processes progress at a slow pace. The standardized contractual elements at the industry-level suggest that in particular provisions with a *safeguarding* and a *contingency adaptability* function are adequate for standardization in stable transaction environments. *Coordinating elements* in the attached Service Level Agreements displayed less standardization. Still, NC's procurement managers attempted to rely on standardized templates and terms for transactions with comparable coordination requirements.

Precautions in interpreting our results are necessary, as our empirical study draws on a small number of contracts from a single company. Further research in related empirical settings, i.e. service contracts in supply chains with a stable transaction environment,

would be in particular informative to challenge our findings. The impact of informal safeguards (trust and reputation), which have been excluded in this study, need to be incorporated to make further qualifications on the net effect of prior interactions on contractual design.

In our empirical study, we found support for a trilateral alignment between transaction attributes, contract design, and complementing governance arrangements. The interdependencies between contract and governance arrangements (in which contracts are enforce and transactions coordinated) are worth further exploration.

6 References

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Figure 1: Transactions in the Vertical Supply Chain for Handling Services

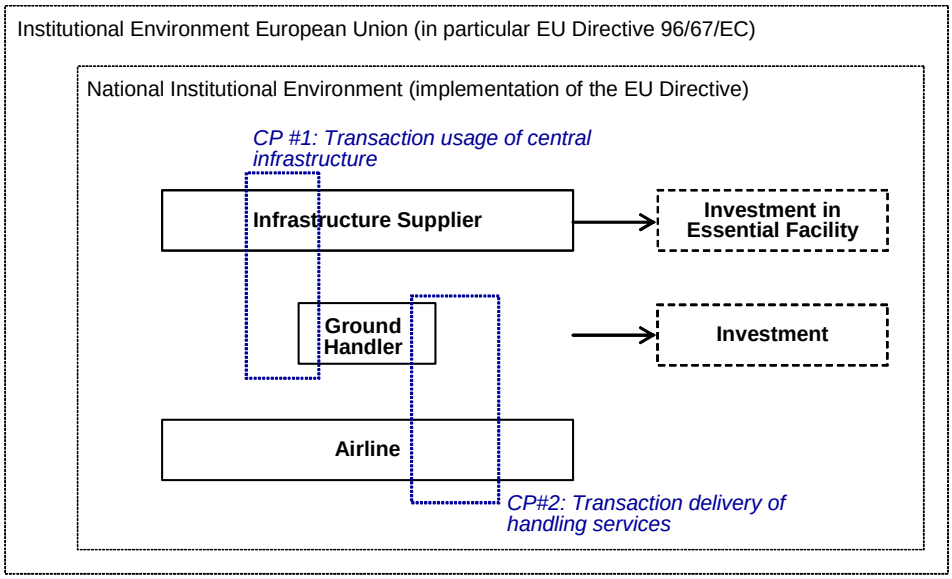

Table 1: Empirical Studies on Contract Design and Functions.

Dependent Variable	Example for Empirical study within Class
Class 1: Contract Type	Crocker and Reynolds (1993) identify 8 distinct contract types based on the price provision as their dependent variable in sample of aircraft engine procurement contracts. (1) Fixed price incentive (successive targets); (2) Fixed price incentive (successive targets) with target ceiling; (3) Fixed price incentive (firm target); (4) Not to exceed price with economic price adjustment; (5) Not to exceed price; (6) Fixed price with economic price adjustment; (7) Fixed price with partial economic price adjustment; (8) Firm fixed price. Other studies distinguish between cost-plus and fixed-price contracts (e.g. Corts and Singh 2004), or introduce contracts with hybrid price provisions as a third alternative (e.g. Kalnins and Mayer 2004).
Class 2: Contract provisions contained in contracts	Parkhe (1993) approximates the dependent variable contractual completeness by the number of observed contracting terms in a sample of alliance contracts: $\textit{Contractual Safeguards} = \frac{1}{36}\sum_{i=1}^{8} D_i,\ D_i = i \text{ if provision } i \text{ exists; otherwise } D_i = 0$ Provisions D_i accounted for: (1) Periodic written reports of all relevant transactions; (2) Prompt written notice of any departure of agreement; (3) The right to examine and audit all relevant records through a firm of CPAs; (4) Designation of certain information as proprietary and subject to confidentiality provisions of the contract; (5) Non-use of proprietary information even after termination of agreement; (6) Termination of agreement; (7) Arbitration clauses; (8) Lawsuit provision. Example for other studies using either weighted or non-weighted measurement constructs by Parkhe (1993) are Deeds and Hill (1999) and Reuer et al. (2003). Saussier (2000) employs a similar measurement construct, but uses a different set of provisions.
Class 3: Contract provisions contained in distinct functional classes in contracts	Eckhard and Mellewigt (2006) propose three dependent variables for complexity of provisions within distinct functional classes: <u>Complexity of terms with a safeguarding function:</u> (1) (Intellectual) property rights; (2) confidentiality; (3) unilateral early termination; (4) dispute resolution. <u>Complexity of terms with a coordinating function:</u> (1) description of responsibilities and tasks; (2) reporting procedures; (3) project schedules/milestones; (4) designation of specific persons as project managers. <u>Complexity of terms with a contingency adaptability function:</u> (1) mutually accepted tolerance zones for dealing with unexpected events or procedures on how to handle changed circumstance or overcome conflicts; (2) price adjustment; (3) engineering change procedure. Studies using a multi-dimensional construct of contractual complexity/completeness are Luo (2002), Ryall and Sampson (2003), Anderson and Dekker (2005), Reuer and Ariño (2006), and Argyres et al. (2006).
Class 4: Qualitative Case Studies	Avadyniak et al. (2001), Dekker (2004), Argyres and Mayer (2004), Klein-Woolthuis et al. (2005).

Table 2: Degree of Standardization and Contractual Function of Observed Provisions

Observed Provisions	**Main Function**	**Standardization (Industry-Level)**	**Standardization (Firm-level)**	**Specific to Contract**
Arbitration/ Law suit	Safeguarding	**X (2003)**		
Contract Duration	Safeguarding			**X**
Uni-lateral Termination	Safeguarding		**X**	
Confidentiality	Safeguarding	**X (1988)**		
Monitoring Rights	Safeguarding	**X (1993)**		
Auditing Rights	Safeguarding	**X (1998)**		
Bilateral Re-negotiation	Contingency Adaptability	**X (1998)**		
Price Indexation	Contingency Adaptability			**X**
Risk share/Incentive provision	Contingency Adaptability			**X**
Service Level Agreement Provision	Coordination/ Safeguarding	**X (1993)**		**X**

Table 3: Correlation Coefficients and Descriptive Statistics

	Correlations Coefficients and Descriptives										
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) *DURATION*[a]	1.00										
(2) *CONTPROV*	0.53	1.00									
(3) *COMPLEX_BIN*	0.51	0.52	1.00								
(4) *COMPLEX_ORD*	0.61	0.60	0.92	1.00							
(5) *MSHARE*	0.62	0.42	0.61	0.71	1.00						
(6) *TSHARE*	0.51	0.47	0.44	0.74	0.53	1.00					
(7) *DELAY*[b]	0.35	0.19	0.00	0.17	0.09	0.40	1.00				
(8) *VOLATILITY*[c]	-0.14	-0.14	-0.20	-0.20	-0.15	-0.13	0.18	1.00			
(9) *EXISTING*	-0.14	-0.39	0.03	-0.01	0.16	-0.13	0.11	0.05	1.00		
(10) *EARLYLIB*	-0.50	-0.27	-0.24	-0.24	-0.26	-0.16	-0.04	-0.10	0.11	1.00	
(11) *LICENSE*	-0.15	-0.04	0.21	0.16	0.05	0.09	-0.31	0.11	0.12	-0.34	1.00
Mean	789.21	0.24	0.36	0.43	0.12	0.07	824.19	0.11	0.79	0.19	0.33
Minimum	60.00	0.00	0.00	0.00	0.00	0.00	250.02	0.03	0.00	0.00	0.00
Maximum	2,520.00	1.00	1.00	2.00	0.75	0.68	1,347.41	0.83	1.00	1.00	1.00
Std. Dev.	594.69	0.43	0.48	0.63	0.15	0.16	228.26	0.13	0.42	0.40	0.48
n=42											

[a] in days

[b] delay minutes per 100 take-offs

[c] number of take-offs (Std. Dev/ Mean)

Table 4: Estimation of Coefficients

	Coefficients, standard error in parentheses				
Dependent Variables	(1) DURATION (OLS)	(2) DURATION (OLS)	(3) CONTPROV (simple Probit)	(4) COMPLEXITY_BIN (simple Probit)	(5) COMPLEXITY_ORD (ordered Probit)
Independent Variables					
C	112.96	517.19*	-0.24	-1.79	
	(278.26)	(282.96)	(1.87)	(2.01)	
MSHARE	2449.84***	1797.5***	6.13**	14.92**	14.92**
	(391.32)	(372.74)	(2.81)	(5.82)	(5.82)
TSHARE	-41.02	353.46	0.30	20.73*	20.74*
	(341.00)	(267.85)	(2.96)	(11.32)	(11.30)
DELAY	0.90***	0.57**	0.00	0.00	0.00
	(0.30)	(0.26)	(0.00)	(0.00)	(0.00)
VOLATILITY	-449.91	-510.17*	-13.13	-10.28	-10.28
	(350.25)	(253.36)	(12.07)	(11.96)	(11.96)
EXISTING	-393.27**	-208.35	-2.13***	-0.02	-0.02
	(153.13)	(195.92)	(0.77)	(0.74)	(0.74)
EARLYLIB		-645.49***			
		(197.01)			
LICENSE		-293.18**			
		(141.32)			
Log Likelihood			-12.47	-10.95	-10.95
Pseudo R^2			0.46	0.60	0.69
Adjusted R^2	0.49	0.63			
N=42					

Significance at 10%, 5%, 1% level (*, **, ***). For the OLS Regressions we used heteroskedasticity-robust t-statistics.

Appendix 1: Example for the coding of the sub service 'moving of aircraft'

3.9. Moving of Aircraft
3.9.1. (a) Provide
or
(b) Arrange for tow-in and/or push-back tractor.
3.9.2 (a) Towbar to be provided by the carrier.
(b) Towbar to be provided by the handling company.
(c) Store and maintain towbar(s) provided by the carrier.
3.9.3 (a) Tow-in and/or push back aircraft.
(b) Tow aircraft between other agreed points.
(c) Provide authorized cockpit brake operator in connection with towing.
(d) Provide wing-walker(s)

Appendix 2: Standard provisions and observed deviations

Type of Provision	Contractual Terms in Industry Standard (SGHA) and observed deviations
Arbitration/ Law suit Provision	**Standard Term in Main Agreement §9 SGHA:** "In the event of any dispute or claim concerning the scope, meaning, construction or effect of this Agreement, the parties shall make all reasonable efforts to resolve disputes amongst themselves. Failing mutual resolution of the dispute, the parties may elect to resolve the dispute through arbitration (either by a single arbitrator or a panel of arbitrators). In the event that the parties fail to agree to an arbitration process, the dispute shall be settled in accordance with the laws of the state or jurisdiction set out in Annex(es)B, by the courts set out in Annex(es)B without regard to principles of conflict of laws." **Example for Modification in Annex B:** **"**Article 9 of the Main Agreement shall be deleted in its entirety. Any dispute arising under or in connection with this Agreement and Annexes including action in tort, shall be governed by the laws of Italy**"**
Termination (Duration)	**Excerpts Standard Term in Main Agreement §11 SGHA:** "This Main Agreement shall continue in force until terminated by either Party giving **sixty days prior notice** to the other Party […] Termination by either Party of all or any part of the services to be furnished at a specific location requires **sixty days prior notice** to the other Party. In the event of part termination of services, consideration shall be given to an adjustment of charges. […]Any Annex(es) B to this Agreement exceeding a defined period of validity, shall continue in effect until terminated by either party providing **sixty days prior notice** to the other Party. […] The Handling Company shall have the right at any time to vary the charges set out in the Annex(es) B provided, however, that the Handling Company has given notice in writing to the Carrier not less than **sixty days prior** to the revised charges becoming effective." **Example for Modification in Annex B:** "notwithstanding sub article 11.4.and sub article 11.5 of the main agreement this agreement cannot be terminated before February, 14th, 2007 […] notwithstanding sub article 11.10 the charges stipulates in paragraphs 1.1.2 and 1.1.3 shall remain fixed until February, 14th, 2007."

Uni-lateral Termination Right	**No Standard Terms in Main Agreement.** **Example for Modification in Annex B:** "if in the opinion of the carrier the handling company fails to provide a consistently satisfactory level of service, the Carrier reserves the right to provide the Handling company with written notice to the effect that correction is required within 30 (thirty) days. If the handling company fails to correct the situation within 30 (thirty) days, the carrier may terminate the Agreement upon an additional 30 (thirty) days prior written notice."
Confidentiality	**Standard Term in Main Agreement §2 SGHA:** "The Handling Company will take all practicable measures to ensure that sales information contained in the Carrier's flight documents is made available for the purposes of the Carrier only. […] Neither Party to this Agreement shall disclose any information contained in Annex(es) B to outside parties without the prior consent of the other Party, unless such information is specifically required by applicable law or by governmental or authorities' regulations, in which case the other Party will be notified accordingly." **Example for Modification in Annex B:** None
Monitoring Rights	**Excerpts Standard Term in Main Agreement §5:** "The Carrier may maintain at its own cost, its own representative(s) at the location(s) designated in the Annex(es) B. Such representative(s) and representative(s) of the Carrier's Head Office may inspect the services furnished to the Carrier by the Handling Company pursuant to this Agreement, advise and assist the Handling Company and render to the Carrier's clients such assistance as shall not interfere with the furnishing of services by the Handling Company. The Carrier may, by prior written notice to the Handling Company and at its own cost, engage an organisation (hereinafter referred to as 'the Supervisor') to supervise the services of the Handling Company at the location(s) designated in Annex(es) B. Such notice shall contain a description of the services to be supervised. The Supervisor shall have the same authority as defined above in Sub-Article 4.1 for the Carrier's own representative." **Example for Modification in Annex B:** None
Auditing Rights	**Excerpts Standard Term in Main Agreement §5 SGHA:** The Carrier may at its own cost, by prior written notice, audit the designated services in the applicable Annex(es) B. Such notice shall contain a description of the area(s) to be audited. The Handling Company shall cooperate with the Carrier and will undertake any corrective action(s) required. **Example for Modification in Annex B:** None
Bilateral Termination Rights	**Excerpts Standard Terms in Main Agreement §11 SGHA:** "Either Party may terminate this Agreement and its Annexes at any time if the other Party becomes insolvent, makes a general assignment for the benefit of creditors, or commits an act of bankruptcy or if a petition in bankruptcy or for its reorganisation or the readjustment of its indebtedness be filed by or against it, provided the petition is found justified by the appropriate authority, or if a receiver, trustee or liquidator of all or substantially all of its property be appointed or applied for. […] Both Parties shall be exempt from obligation if prompt notification is given by either Party in respect of any failure to perform its obligations under this Agreement arising from any of the following causes; - labour disputes involving complete or partial stoppage of work or delay in the performance of work; - force majeure or any other cause beyond the control of either Party." **Example for Modification in Annex B:** None

Bilateral Renegotiation Right	**Excerpts Standard Term in Main Agreement §11 SGHA:** "Notwithstanding Article 11.11, when changes occur in the schedule, and/or frequencies and/or types of aircraft, other than those set out in Annex(es) B, which affect the handling costs, either Party shall have the right to request an adjustment to the handling charges as from the date of the change provided that the Party concerned informs the other Party within thirty days of the change.**"** **Example for Modification in Annex B:** None
Price Indexation	**No Standard Terms in Main Agreement.** **Example in Annex B:** "This annex B shall be valid for three years (30 November 2007) with reviews applicable on the 01st December 2005/6 at 85% of the published figure for RPI"
Risk share/Incentive Provision	**No Standard Terms in Main Agreement.** **Examples:** "In the event that such a reduction of flight volume shall be implemented […] the prices quoted […] shall be raised to provide the Handling company with an annual benefit of €55.000" "[D]epending on NC's traffic growth, the [handling company] will generate productivity gains or losses […] in the case of an increase/decrease of its traffic volume, NC shall benefit from such gains or participate in the losses"
Service Level Agreement	**Excerpts Standard Term in Main Agreement §5:** "The Parties shall reach mutual agreement on the quality standards for any services, not excluding those covered by Sub-Article 5.1 above. Such quality standards for a specific location may form part of the applicable Annex B. The Handling Company agrees to take all possible steps to ensure that, with regard to contracted services, the agreed upon quality standards will be met." **Standard Contract delegates this responsibility to contracting parties**