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# Qualitative Comparative Analysis as a Method for Innovation Research: Analysing Legal Innovations in OECD Countries

Thomas Laux\*

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**Abstract:** »Qualitative Comparative Analysis als Methode für die Innovationsforschung: Eine Analyse rechtlicher Neuerungen in OECD-Staaten«. The article presents Qualitative Comparative Analysis (QCA) as a method for innovation research. Based on set-theory, a key feature of QCA is the possibility to examine the necessary and the sufficient conditions for the institutionalisation of innovations. QCA aims to identify equifinal explanations for a social phenomenon, which consist of a combination of several conditions. This approach distinguishes QCA from qualitative and quantitative methods. Furthermore, QCA combines a comparative and a case-oriented approach, which is especially interesting for the analysis of innovations as context-sensitive and contingent phenomena. QCA as a research approach and method is outlined briefly, with special regard to the tasks of innovation research. Its application is presented in a study of the conditions for equal pay regulations in OECD countries. The analysis shows that the relevant actors for the institutionalisation of equal pay regulations are either women's movements or unions but that neither are solely sufficient for this legal innovation. Instead QCA also captures the context conditions for their impact on the enactment of equal pay regulations.

**Keywords:** Innovation research, QCA, legal innovation, gender equality, world-polity, women's movement, equal pay, civil society.

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## 1. Introduction<sup>1</sup>

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Innovations are 'ubiquitous' phenomena in modern societies and thus an object of research in the social sciences (Braun-Thürmann 2005, 12). Originally innovation research focused on economy and science, but since then innovations have been detected and examined across all social spheres (cp. Schumpeter 1952, 94f; Zapf 1989, 175ff). Thus innovation research aims to study the simi-

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larities and differences between innovation processes in different spheres in order to develop theories of innovation.

To this end Hutter et al. (2015, in this HSR Special Issue) distinguish three complementary perspectives for the analysis of innovation processes: the concrete actions that diverge from established patterns of doing things and thereby constitute the practical foundation of an innovation ('pragmatics'), its labelling or recognition as novel and useful ('semantics') and the institutional conditions, which foster or prevent the implementation of innovations ('grammar'). Each perspective demands a different methodological approach for innovation research. This article presents Qualitative Comparative Analysis (QCA) as a method for investigating the institutional conditions for the implementation of innovations.

The institutionalisation is essential for an innovation because it marks the difference between an invention and an innovation (Krücken 2005, 65). This refers to the definition of an innovation, which is the basis for illustrating the benefits of QCA for innovation research: (1) Innovations are intended and emerge out of a combination of already existing components (Schumpeter 1952, 96). They are the outcome of the interplay between different actors in a specific context. (2) Innovations promise novel and better possibilities for problem solving or to gain better results. In doing so, innovations differ from existing modes of problem solving, have far-reaching impact on further developments and are perceived as fundamental changes (Kern and Nam 2009, 639; Polsoy 1984, 8; Rogers 1995, 11). (3) Innovations can only be identified ex-post in case of their success, which consists of their institutionalisation.<sup>2</sup> One task for innovation research is to analyse the relevant conditions for their success (John 2012, 82).

To grasp the relevant conditions for an innovation, its qualitative differences and benefits are to be identified. Innovations normally solve a problem or a deficit, which points to the cultural background of their success (Kern and Nam 2009, 638f; Rogers 1995, 392). So the demand for an innovation may arise from economic needs – like the expansion into new markets or the reorganization of production processes – or social and cultural changes – like the emergence of social problems or new 'cultural visions' (Kern and Nam 2009, 638; cp. Schumpeter 1952, 101). Altogether, innovation processes do not proceed automatically, but are contingent and context-sensitive (Braun-Thürmann 2005, 50).

The analysis of the relevant actors and the enabling structural contexts for innovations has always been one of the continuous tasks for innovation research, e.g. Gilfillan (1970 [1935]) analysed the societal influences on the invention of the steamboat in a case study and provided a sociological perspective on inventions. Nowadays there are numerous methods to analyse the institutionalisation of innovations, which may be roughly divided into qualitative or quantitative approaches. The most frequently used ones are ethnographic stud-

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<sup>2</sup> Because innovations do interrupt existing routines, they are initially labelled as deviant. Later, after their institutionalisation, they are labelled as novel and innovative.

ies (e.g. Knorr-Cetina 1983) and the systems of innovations research (e.g. Blättel-Mink 2009; OECD 2005). Although both approaches offer important insights into the institutionalisation of innovations, they also possess some weaknesses. On the one side ethnographic case studies examine the enactments of novelty and innovations in an explorative way. The insights are hardly generalizable, lack a comparative perspective and the studies rarely involve the institutional contexts (Siebenhüner 2007, 107; Werle 2005, 320).<sup>3</sup> The systems of innovation research, on the other side, offers comparative analyses of the technological and institutional effects on the competitiveness of countries and their economic growth (Blättel-Mink and Ebner 2009, 11). Innovations are understood as continuous processes and are measured by looking at key figures, like the number of new patents (Blättel-Mink 2009, 177; OECD 2005). The systems of innovations research mainly concentrates on the endogenous explanation of innovations by referring to technological or economic developments. It fails to clarify the systemic interdependence of the different factors and cannot give further insights into the developing process of a specific innovation. No attention is paid to the distinctive characteristics of innovations, which are responsible for their success (Siebenhüner 2007, 109; Werle 2005, 313ff).

The strengths of both approaches should be combined for a more thorough analysis of innovations (Siebenhüner 2007, 113). The assumption of this article is that QCA as a research approach and method offers significant insights for the study of the institutional conditions for innovations by combining a comparative and a case-oriented approach. This does not imply that QCA is better than qualitative or quantitative methods for innovation research. Instead QCA is an alternative to the existing methods and offers unique features, which may be also relevant for innovation research.<sup>4</sup> Based on set-theory, QCA is a diversity-oriented research method (Schneider and Wagemann 2012, 8). It enables the conduction of mid-N studies, which are highly relevant for innovation research because innovations are avant-garde and need not occur as mass-phenomena (Ragin 2000, 25). Furthermore QCA makes it possible to conduct case studies on the basis of a structured comparison. Thereby, the context sensitivity of innovation processes is captured along with their overall enabling conditions. The aim is to identify mechanisms for innovations and to develop middle-range theories to explain the success of innovations.<sup>5</sup>

The basic principles of QCA and their application for innovation research are outlined in chapter 2. It involves the short discussion of some tasks for innovation

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<sup>3</sup> According to the presented definition, the ethnographic perspective is not applicable ex-post and thus focusses on the analysis of inventions or novelties and not of innovations.

<sup>4</sup> Originally, QCA was invented in 1987 by Charles C. Ragin (1987) to bridge the gap between quantitative and qualitative methods. Since then, QCA has been established as an autonomous research approach and method in the social sciences.

<sup>5</sup> Referring to Mayntz (2004, 241) mechanisms are defined as 'sequences of causally linked events that occur repeatedly in reality if certain conditions are given.'

research in order to illustrate QCA's advantages and shortcomings for innovation research. QCA's application in the study of innovations is then illustrated in chapter 3 which contains a brief presentation of an analysis of the institutionalisation of equal pay regulations in OECD countries as legal innovations.

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## 2. QCA as a Method for Innovation Research

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The following part gives a brief overview of the principles and assumptions of QCA: The aim is to present QCA's benefits for analysing the institutional conditions for innovations. Not all the relevant aspects will be discussed extensively in this chapter.<sup>6</sup> The focus is on the characteristic features of QCA and some principles of set-theory in order to illuminate their potential for innovation research. In addition the analytical process of QCA is briefly outlined. This includes the explanation of fuzzy-sets and the functions of a truth table.

As a research approach QCA is characterized by the attempt to strengthen "the dialogue between ideas and evidence" (Ragin 2000, 309) as well as to develop new theoretical insights. QCA enables the identification of middle-range theories, which may enrich or modify existing assumptions about innovation processes (Merton 1967; Ragin 1987, 170).

QCA is diversity oriented and tries to identify different solutions (i.e. combinations of institutional settings and/or actors) for a particular outcome (i.e. the success of an innovation) (Schneider and Wagemann 2012, 8). Its diversity orientation corresponds with the assumption that innovation processes do not proceed uniformly but instead according to different contexts and actors. Three principles – "equifinality, conjunctural causation and asymmetry" (Schneider and Wagemann 2012, 8) – define QCA's specific approach to social research: Equifinality describes that "different, mutually non-exclusive" conditions for an outcome must be discovered to explain one outcome (Schneider and Wagemann 2012, 326). The aim is to discover different solutions for an outcome with respect to the differences between the cases. Conjunctural causation describes the fact that the conditions are necessary or sufficient "in combination with precisely specified other conditions" (Schneider and Wagemann 2012, 324). By looking for combinations of conditions, it is possible to grasp their interrelation – the conjunctural and sequential causalities – and to examine their specific social and historical environment (cp. McAdam et al. 2008, 309). Asymmetry as the third principle "implies that a causal role attributed to a condition always refers to only one of the two qualitative states" (Schneider

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<sup>6</sup> The books by Charles C. Ragin (1987, 2000, 2008b) offer insights into the fundamental concepts behind QCA and illustrate its development since the invention in 1987. An introduction to *Set-Theoretic Methods for the Social Sciences* (Schneider and Wagemann 2012) was recently published.

and Wagemann 2012, 322). This means that the reversal of a solution does not automatically explain its opposite.

The cases are understood holistically as configurations with multiple and different memberships in different sets (Ragin 1987, 16, 99). Such configurational thinking is more appropriate in qualitative research and pays attention to the context of social phenomena (Ragin 2008b, 109). Such an approach suits the analysis of innovations as contingent and context-sensitive (cp. Braun-Thürmann 2005, 50).

Sets represent empirical concepts, e.g. states with a strong equal pay regulation or the existence of a strong women's movement. The set-memberships indicate, "whether a case belongs to a concept (i.e., a set) or not" (Schneider and Wagemann 2012, 24).<sup>7</sup> Each condition and the outcome are operationalized by using a clearly defined concept. Then the interrelations of the set-memberships of the cases are compared in order to identify the necessary and sufficient conditions for an outcome (Schneider and Wagemann 2012, 79; Ragin 1987, 85-102).

A condition or a combination of conditions is sufficient if the cases' membership scores are equal or lower than their memberships in the outcome (Schneider and Wagemann 2012, 333). So the set of the condition is a subset of the outcome set and there are several sufficient conditions for explaining an outcome.<sup>8</sup> A necessary condition is identified if the cases' membership scores in the condition are equal or bigger than their memberships in the outcome (Schneider and Wagemann 2012, 330).<sup>9</sup> The necessary condition is a superset to the outcome set.<sup>10</sup>

The analytical process of QCA can be divided into three phases: The 'pre-QCA phase' encompasses the selection of the cases and the conditions (Schneider and Rohlfing 2013, 3). The choice of conditions is guided by theoretical assumptions as well as "empirical insights gained during the research process"

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<sup>7</sup> Thus the data need to have a binary structure. A score of 1 shows full membership of a case in a set, whereas a score of 0 shows its full non-membership (Ragin 1987, 86f). The set memberships express attributes of the cases and indicate 'whether a case can be described by a concept or not' (Schneider and Wagemann 2012, 24).

<sup>8</sup> A sufficient condition is characterized by the INUS condition, which says that the condition is an 'insufficient but necessary part of a condition which is itself unnecessary but sufficient for the result' (Goertz 2003, 68; Mackie 1974, 62; Mahoney 2008, cited by Schneider and Wagemann 2012, 79).

<sup>9</sup> A necessary condition is characterized by the SUIN condition, which says that it is a 'sufficient, but necessary part of a factor that is insufficient, but necessary for the result' (Mahoney et al. 2009, 126, cited by Schneider and Wagemann 2012, 79). A necessary condition is a superset to the set of the outcome (Schneider and Wagemann 2012, 330).

<sup>10</sup> Necessary conditions must be distinguished from trivial ones. Trivial conditions do occur in all or nearly all cases, independent of the outcome (Schneider and Wagemann 2012, 144f). As a result, they do not affect the outcome and must be excluded from the analysis.

(Schneider and Wagemann 2012, 277).<sup>11</sup> Subsequently the memberships of the cases in the sets of the conditions are assigned. This process is called calibration and there are two notions of assigning membership to a set: the first one is using crisp sets (cs), which solely differentiate between membership (1) and non-membership (0) in a set. Crisp sets eliminate the qualitative differences between the cases (Schneider and Wagemann 2012, 24f). Hence, fuzzy sets (fs) were introduced to assign membership in a set and allow to capture different degrees “among qualitatively similar cases” and transform these differences into “partial memberships” (Schneider and Wagemann 2012, 326; Ragin 2000; Zadeh 1965).<sup>12</sup> Fuzzy sets enable the operationalisation of vague concepts that are predominant in the social sciences (Ragin 2000, 3ff). This is especially important for defining innovations, because they are essentially characterized by a qualitative difference from existing artefacts (see the given definition of an innovation at the beginning of the article).

The calibration is based on both theoretical knowledge and empirical evidence about the cases, which ensures the consideration of qualitative differences between the cases (Ragin 2008a). Three threshold values or anchors must be defined to turn the raw data into set memberships: First, full membership (1) in a set as well as full non-membership (0) in a set have to be defined. The third threshold value marks “the point of maximum indifference” (0.5) (Schneider and Wagemann 2012, 32). The definition of the 0.5 anchor is important because it differentiates between cases that are majoritarian members in a set and those that are not (Schneider and Wagemann 2012, 58). The three anchors do not reflect a continuous scale, but mark qualitative differences (Schneider and Wagemann 2012, 28ff). To ensure the reliability of the calibration, it is necessary to reveal the threshold values, the raw data and the method of calibration (Schneider and Wagemann 2010, 403, 413).<sup>13</sup>

Three operations are possible to determine the set-relations between the cases and between the conditions with all three based on Boolean algebra (see table 1 for the notations): The negation of a membership in a set indicates the complete non-membership of a case, which automatically indicates membership in the complementary set (Schneider and Wagemann 2012, 54; Zadeh 1965, 340). Sets are connected using either a multiplication – a logical AND – or an addition – a logical OR. The multiplication of two or more sets shows the intersection of at

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<sup>11</sup> The majority of QCA studies select the conditions for analysis both based on theoretical assumptions and empirical evidence. Generally QCA is an inductive research approach. Nonetheless, it is also possible to evaluate theories with QCA (see Schneider and Wagemann 2012, 295-305).

<sup>12</sup> By using fuzzy sets, “a continuum of grades of membership’ is applied to a set which resembles the interval scale” (Zadeh 1965, 339).

<sup>13</sup> The calibration is done by using either the direct or the indirect method: The direct method automatically transforms the raw data into fuzzy sets according to the three anchors. The proportion of data mostly remains the same. The indirect method uses additional anchors to capture qualitative differences within the data (Ragin 2008a, 186-92; Verkuilen 2005, 486).

least two conditions, e.g. to illustrate their interdependence. The membership in the result set of the multiplication is determined by the lowest membership score of the case in one of the sets (Schneider and Wagemann 2012, 328). An addition describes the union of two or more sets and the membership of a case is assigned by the highest membership score of the case in one of the sets (Schneider and Wagemann 2012, 329). The underlying assumption is that the conditions are in a compensatory relation – e.g. the sets refer to functionally equivalent conditions (Traeger 1994, 34; Zadeh 1965, 341).

**Table 1:** Notations of the Basic Operations in Set Theory

Operation	Negation	Multiplication/logical AND	Addition/logical OR
Notation	~	*	+

Source: Author's elaboration based on Schneider and Wagemann (2012, 54) and Zadeh (1965, 340f).

The set-theoretical operations make it possible to capture different conjunctions of the cases' set memberships. They serve as the basis for the truth table, which presents all logically possible combinations of the chosen conditions as well as all information about the cases (Ragin 1987, 87; Schneider and Wagemann 2012, 91). Therein each set is displayed in a column and each row represents "one of the logically possible AND combinations between the conditions" (Schneider and Wagemann 2012, 92). Thus the size of the truth table depends on the number of conditions.<sup>14</sup>

The calibration of the set memberships is the prerequisite for constructing the truth table. The comparative cross-case analysis is the second phase of the analytical process (Schneider and Rohlfing 2013, 3).<sup>15</sup> As an example, table 2 presents twelve hypothetical cases and their membership scores in the three conditions (i), (ii) and (iii). To keep the example simple, crisp sets are used for calibration.<sup>16</sup>

<sup>14</sup> The formula is  $2^k$ , with k standing for the number of conditions (Schneider and Wagemann 2012, 92).

<sup>15</sup> Detailed descriptions of the construction and the analysis of a truth table are presented in the fourth chapter of the book by Schneider and Wagemann (2012, 91-115).

<sup>16</sup> The assignment of cases to a truth table is not straight forward for fuzzy sets, because the membership scores in the conditions may not perfectly fit the truth table rows (Schneider and Wagemann 2012, 96f). The combinations of conditions in the rows must be understood as 'ideal types': The empirical cases are then attributed to the ideal types by studying their membership scores in each condition and in the combination of conditions. Each case has only one membership  $> 0.5$  per row. The cases are assigned to the combination to which they fit best. This illustrates the importance of the point of maximum indifference and justifies the prohibition of calibrating a membership score with 0.5 (Schneider and Wagemann 2012, 102f).



**Table 2:** Hypothetical Data Matrix of Twelve Cases and their Calibrated Crisp Set Membership Scores to Three Conditions (i), (ii), (iii) and to an Outcome

Number	Case	(i)	(ii)	(iii)	Outcome
1	A	1	1	1	1
2	B	1	1	0	0
3	C	0	0	0	0
4	D	0	1	0	1
5	E	1	0	1	0
6	F	0	1	1	1
7	G	1	0	0	0
8	H	1	1	1	1
9	I	1	0	0	0
10	J	1	0	1	0
11	K	0	0	0	0
12	L	0	1	0	1

Source: Author's elaboration based on Schneider and Wagemann (2012, 95).

1 = The case has full membership in the set of the condition or the outcome.

0 = The case has no membership in the set of the condition or the outcome.

This data matrix is transformed into a truth table containing eight logically possible combinations of the three conditions (see table 3).<sup>17</sup> The truth table shows that only seven of the eight logically possible combinations do materialize in a (hypothetical) empirical reality. The fourth row shows a 'logical remainder' and illustrates the 'limited diversity' of empirical reality, which is caused by the interrelations of the conditions. Some rows do present more than one empirical case (Ragin and Sonnett 2005, 181; Schneider and Wagemann 2012, 93).

**Table 3:** Hypothetical Truth Table Showing the Eight Logically Possible Combinations of the Three Conditions

	(i)	(ii)	(iii)	Outcome	Case
1	0	0	0	0	C, K
2	1	0	0	0	G, I
3	0	1	0	1	D, L
4	0	0	1	0	--
5	1	1	0	0	B
6	1	0	1	0	E, J
7	0	1	1	1	F
8	1	1	1	1	A, H

Source: Author's elaboration based on Schneider and Wagemann (2012, 96).

The actual analysis in QCA consists of the formal analysis of the truth table in order to identify the necessary and sufficient conditions for an outcome (Ragin

<sup>17</sup> The construction of the truth table as well as the assignment of the cases to its rows is normally carried out automatically by the software programs for QCA. Different software programs exist – e.g. fs.QCA 2.5 – which have been especially developed for QCA (Ragin and Davey 2009). Applications for STATA and R are also available.

1987, 87). The analyses of the necessary and the sufficient conditions are conducted separately (Schneider and Wagemann 2012, 75f). First, the analysis of the necessity of one of the conditions for the outcome is conducted. Then the analysis of sufficient conditions is carried out by minimizing the truth table (Schneider and Wagemann 2012, 104ff).<sup>18</sup> The minimization is done using the Quine-McCluskey algorithm, which compares the conjunctions in order to identify similar ones. Therein “logically redundant prime implicants” are excluded because they are identified as non-relevant for explaining the outcome (Schneider and Wagemann 2012, 332). As a result, the sufficient solution terms of the minimization process sum up the entire truth table in compressed form (Schneider and Wagemann 2012, 107). According to the principle of equifinality, they describe different combinations of conditions that lead to an outcome.

In order to estimate the quality of the solution terms, two parameters – coverage and consistency – have to be considered. Coverage describes the relationship between the set of a condition ( $x_i$ ) and an outcome set ( $y_i$ ). For necessary conditions, the coverage measure is crucial to distinguish between the necessary and trivial conditions. The latter are disproportional to the outcome set and are thus not relevant for the outcome because a trivial condition is present in (nearly) all the cases, regardless of the outcome (Schneider and Wagemann 2012, 332).<sup>19</sup> The coverage for sufficient conditions (‘solution coverage’) describes the proportion of cases with a set-membership  $> 0,5$  in the set of at least one solution term. It specifies the relationship between all the cases and the explained cases while showing how many cases are covered by a solution term (Schneider and Wagemann 2012, 131f).<sup>20</sup>

The consistency measure indicates the intersection of the outcome set and the set of the conditions (Schneider and Wagemann 2012, 324). For necessary conditions, the consistency shows the extent to which the outcome is a subset of the condition and qualifies the ‘statement of necessity’ for the condition. It reveals the proportion of cases for which the statement of necessity is not correct (Schneider and Wagemann 2012, 141).<sup>21</sup> For sufficient conditions consistency indicates the extent to which a condition explains the outcome. If a condition is a complete subset of an outcome, the consistency is perfect (Schneider and Wagemann 2012, 123f). The consistency measure shows “the

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<sup>18</sup> A brief summary with all the relevant instructions on how to conduct the logical minimization is given by Ragin (2008b, 124–44).

<sup>19</sup> To distinguish between necessary and trivial conditions, the formula ‘Relevance of necessity’ was introduced:  $\frac{\sum (1-x)}{\sum (1-\min(x,y))}$  (Schneider and Wagemann 2012, 236). It defines the explanatory power of a condition: the smaller the relevance, the more trivial the condition.

<sup>20</sup> The formula is: ‘Coverage Sufficient Conditions =  $\frac{\sum \min(x,y)}{\sum y}$ ’ (Schneider and Wagemann 2012, 131).

<sup>21</sup> The formula is: ‘Consistency Necessary Conditions =  $\frac{\sum \min(x,y)}{\sum y}$ ’ (Schneider and Wagemann 2012, 141).

degree to which the empirical information deviates from a perfect subset relation” (Schneider and Wagemann 2012, 129).<sup>22</sup>

After minimizing the truth table and identifying the necessary and the sufficient conditions, the solution terms must be verified with respect to the conjunctural and sequential causalities of the conditions. This is part of the ‘post QCA’ phase which consists of reconstructing the solution terms by referring to typical cases for each solution term as well as deviant cases, which are not covered by one of the solution terms (Schneider and Rohlfing 2013, 3).<sup>23</sup> Because of its case orientation, QCA is closely connected to other methodical approaches, like case studies or process-tracing.

The solution terms serve as a basis for conducting case studies by providing information about the relevant necessary and/or sufficient conditions for the success of an innovation. Based on this, the case studies make it possible to check the plausibility of the solution terms and to identify the temporal as well as the causal mechanisms within the phases of innovation processes (Abbott 1995, 95; Beach and Pedersen 2013, 158). Furthermore, the case studies offer the possibility for in-depth analysis of the emergence of innovations as well as their labelling as novel. The reconstruction of the solution terms through process-tracing adds a ‘within-case’ perspective to the comparative approach and allows one to inquire into the conjunctural and sequential mechanisms explaining the outcome (Baur 2005; Beach and Pedersen 2013, 158; Schneider and Rohlfing 2013, 28). By doing so, the empirical findings of the comparative analysis may offer insights for modifying the theoretical assumptions (Ragin 2000, 144; Schneider and Rohlfing 2013, 30f).

The affinity between QCA and reconstructive approaches makes it possible to bridge the gap between case study research on the emergence or invention of innovations and comparative research on the conditions for the success of innovations. Both perspectives are combined to adequately capture innovation processes.

The case reconstructions in combination with the solution terms serve as a basis for developing types of mechanisms (Kluge 2000). Empirically based types are a first step to identify general mechanisms for innovations in different institutional areas. The types of mechanisms serve as middle-range explana-

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<sup>22</sup> The formula is: ‘Consistency Sufficient Conditions =  $\frac{\sum \min(x,y)}{\sum x}$ ’, (Schneider and Wagemann 2012, 126).

<sup>23</sup> Typical cases can be identified by studying their membership scores both in the outcome set and in the set of the conjunction. High membership scores in both sets indicate their fit to the solution term (Schneider and Rohlfing 2013, 5). Deviant cases are identified by applying an XY plot of the solution term sets and the outcome set. Deviancy may occur with respect to consistency or coverage. Deviant cases for consistency do not have a membership score in one of the sets of the solution terms, but do have a membership score > 0.5 in the outcome set. Deviant cases for coverage do have a membership > 0.5 in one set of the solution terms, but lack a membership score > 0.5 in the outcome. Such cases can be explained by looking at special features which may cause their deviancy (Schneider and Rohlfing 2013, 28).

tions for a particular innovation and may lead to more general and sophisticated theories of innovations (cp. Merton 1967, 43; Ragin 1987, 118).

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### 3. Equal Pay for Women and Men: Analysing the Conditions for a Legal Innovation with QCA

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This chapter presents a brief description of an analysis of a legal innovation to illustrate the procedure as well as the possibilities of QCA as a method for innovation research. The subject of the analysis is the institutionalisation of equal pay regulations for women and men in OECD countries.<sup>24</sup> The aim is to inquire into the conditions for the institutionalisation of equal pay regulations as legal innovations.

First, the equal pay regulations for women and men need to be defined as innovations. As outlined before, three aspects characterize an innovation: It is (1) an intended combination of already existing components. Equal pay regulations consist of two elements which are intentionally combined in order to guarantee equal pay for women and men (cp. Schumpeter 1952, 100): The first element is the ‘equal pay for work of equal value’ mode for wage determination. It was first introduced by the International Labour Organization (1951) in the Equal Remuneration Convention No. 100 and draws a distinction between the physical abilities and preferences of women and men (England 1992, 190f).<sup>25</sup> This ‘comparable worth’ mode allows one to identify differences in occupations that are predominantly performed by either women or men (England 1992).<sup>26</sup> The second element consists of a specialized body to evaluate the compliance with the equal pay regulation. The key features of the specialized body are its independence from the government as a prerequisite and its authority, which is defined by its ability to carry out investigations and take “legal action against companies” (OECD 2008; cp. Schöpp-Schilling 1988, 229; Winter 1998, 330).<sup>27</sup>

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<sup>24</sup> A similar and much more detailed analysis is presented in Laux (2014a, 147-66).

<sup>25</sup> The convention states, ‘the term equal remuneration for men and women workers for work of equal value refers to rates of remuneration established without discrimination based on sex’ (International Labour Organization 1951). Subsequently, a classification system has to be introduced to define ‘work of equal value.’

<sup>26</sup> The consideration of horizontal segregations in the labour market ensures that different occupations do not automatically lead to wage inequalities (Baer 2004, 74; England 1992, 304f).

<sup>27</sup> One example for such a specialized body is the Equal Employment Opportunity Commission (EEOC), which has been established by Title VII of the Civil Rights Act in the USA in the 1960s (Graham 1992, 52; Pedriana 2006, 1736). Originally, the EEOC was introduced to fight racial discrimination, but was expanded to include gender discrimination. The EEOC gained more powers during the 1960s and 1970s – e.g. the authority of jurisdiction (Graham 1992, 52, 60). The EEOC served as a role model for other countries.

The combination of both elements defines a strong equal pay regulation and is designed to enforce equal pay for women and men according to their qualifications and their occupation with no regard for their gender. It promises (2) a novel and better way to ensure equal pay for women and men and marks a fundamental change to already existing modes for the solving of this problem (cp. Kern and Nam 2009, 639; Polsby 1984, 8; Rogers 1995, 11). Wage determination is not left to the actors in the economic system, e.g. through negotiations between employees and employers. Instead, the specialized body has the authority to supervise the wage determination, based on the principle ‘equal pay for work of equal value.’ It breaks ‘with the preceding governmental responses’ to the problem and introduces a novel procedure to legally regulate wage determination for employees (Polsby 1984, 8). Thus, the equal pay regulation for women and men is an innovation in the legal field (Castro 2012; Duffy 2007). It is defined as an ‘advance,’ which is “better in accomplishing the purposes of the law” (Duffy 2007, 3) and is embedded in a broader ‘cultural vision’ (Kern and Nam 2009, 638) of modern societies, in which attributes like race or gender do not influence the opportunities available to a person (Parsons 1972; Schimank 2005, 242). The equal pay regulation is a reaction to the discriminatory practices in wage determination which are perceived as a social problem. Wage inequalities between women and men exist in all OECD countries – only the size of the gender pay gap differs. One possible explanation for the persistence of wage inequalities is the absence of effective equal pay regulations (Weichselbaumer and Winter-Ebmer 2005, 486). The identification of innovations is only possible ex-post (3). It becomes apparent that a strong equal pay regulation is institutionalised in 50% of the OECD countries, which shows its success as an accepted way of ensuring equal pay for women and men (Laux 2014a). The task is then to analyse the relevant conditions for its institutionalisation (cp. John 2012, 82). In case of legal innovations, it is trivial to suppose that the legislation is solely responsible for the institutionalisation of the equal pay regulation. Instead the relevant conditions of the context as well as the actors are analysed in order to explain the success of the equal pay regulation in OECD countries.

The comparative analysis using QCA focuses on the institutional conditions for the equal pay regulation for women and men (the ‘grammar’). Thereafter, the mechanisms must be identified by referring to typical cases, which offers the opportunity to highlight the special features of the innovation processes. 28 OECD countries are included in the analysis and it is conducted as a cross-country comparison for the year 2007. The relative similarity of the cases, in terms of prosperity and the quality of democracy, allows one “to isolate the factors responsible for differences between them” (Lipset 1990, xiii, cited by Hague and Harrop 2004, 83).<sup>28</sup>

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<sup>28</sup> The selected countries are Australia, Belgium, Denmark, Germany, Finland, France, Ireland, Iceland, Italy, Japan, Canada, Mexico, New Zealand, Netherlands, Norway, Austria, Poland, Por-

### 3.1 Theoretical Assumptions

The study of the institutionalisation of equal pay regulations is conducted using assumptions of institutional analysis and civil society research. The aim is to ascertain whether the equal pay regulations are institutionalised because of endogenous or exogenous conditions. The theoretical assumptions address different conditions for the institutionalisation of equal pay regulations for women and men that focus on transnational and nation-state factors.

The impact of transnational standards on the legal system of nation states is stressed in world-polity research (Heger-Boyle and Meyer 1998). The assumption is that laws and regulations are predominantly institutionalised because of exogenous normative or mimetic institutional change (DiMaggio and Powell 1983).<sup>29</sup> The reason for institutionalising equal pay regulations lies in the states' intention to gain legitimacy (Berkovitch 1999; Heger-Boyle and Meyer 1998). The equal pay regulation for women and men was, as mentioned earlier, first introduced by the ILO Convention No. 100 and was then adapted by the European Union (EU) (EEC 1976). The ILO convention has been ratified by all OECD countries except the USA (ILO 2012). Hence, it is not useful to explain the differences between countries. Instead, the impact of the EU must be analysed by distinguishing between EU members and non-members. The EU embodies the world-polity and is perceived as highly influential in promoting the equality of women and men (Hafner-Burton and Pollack 2002; Klein 2013; Meyer 2005; Wobbe and Biermann 2007). Thus the first assumption (I) states that EU membership is a sufficient condition for explaining the institutionalisation of the equal pay regulation.

The world-polity approach also stresses the impact of International Non-governmental Organizations (INGOs) for the institutionalisation of gender equality laws (Berkovitch 1999; Boli and Thomas 1997). INGOs, as exogenous actors, supervise the institutionalisation of global standards – like the equal pay for women and men – and translate these standards to the local contexts. Additionally, they may draw public attention to deficits – e.g. a huge gender pay gap – in a country and put pressure on governments to effect change in the form of equal pay regulations (Boli and Thomas 1997, 180ff). The second assumption (II) is that a significant representation of INGOs in a country may be sufficient for the institutionalisation of equal pay regulations for women and men.

Besides the two assumptions about the influence of exogenous conditions, four assumptions about endogenous conditions and actors are analysed: The institutionalisation of innovations may also be affected by their legitimacy within the population (Strang and Soule 1998, 279). As mentioned earlier,

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tugal, Sweden, Switzerland, Slovakia, Spain, South Korea, Czech Republic, Turkey, Hungary, UK and USA. Greece and Luxemburg were excluded from the analysis because of a lack of available information.

<sup>29</sup> There is no superior authority that can force states to institutionalise equal pay regulations. This is why the coercive isomorphism mechanism is not applied in the analysis (cp. Beckert 2010, 158).

equal pay regulations can be subsumed as part of the general tendency towards inclusion (Parsons 1972). But cultural differences with respect to gender equality must be observed in order to identify the fit of such equal pay regulations to the cultural background (Heger-Boyle et al. 2002; Kern 2010). Cross-cultural differences in attitudes towards the equality of women and men were discovered by Inglehart and Norris (2003, 2004). So the third assumption (III) states that attitudes supporting gender equality are sufficient for the institutionalisation of equal pay regulations in a country.

The following assumptions refer to civil society theory, which stresses the importance of processes within the political system and the civil society for legislation (Alexander 2006). Three different ‘entrepreneurs’ for legal innovation are analysed (Schumpeter 1952, 116): The first are women’s movements, which are crucial for demanding full inclusion and legal equality for women (Alexander 2006, 219). Especially the second wave of women’s movements began questioning wage inequalities and protesting against discrimination because of gender. The women’s movements were and are important for the institutionalisation of equal pay regulations because they pressured legislation to establish legal innovations (Eder 2000, 211; Laux 2015). Their strength is defined by evaluating their visibility and their activities in public (Eder 2000, 85; Kern 2008, 15). The sufficiency of a strong women’s movement for the institutionalisation of the equal pay regulation for women and men is the fourth assumption (IV).

Other relevant actors for changing labour regulations are unions. Historically, they have been engaged in bringing about improvements for employees (Ebbinghaus and Visser 1998, 11f). But their commitment to strengthening gender equality is ambiguous because they have been dominated by male employees and, therefore, represented male interests. Their ambiguity as actors for gender equality has been demonstrated in many studies (Becker 1971, 62; Blascke 2008; Kreckel 2004, 276). The fifth assumption (V) states that strong unions are sufficient for the institutionalisation of equal pay laws for women and men.<sup>30</sup>

Other relevant actors for the institutionalisation of equal pay regulations may be left-wing parties and female representatives in parliament. Their importance arises out of the central role of the legislation for enacting rules and regulations. Thus, the composition of the legislative bodies is to be analysed. Both groups foster laws for equality between women and men in an equivalent way (Htun and Weldon 2010, 208; Laux 2015; Norris 1998, 185). The sixth assumption (VI) claims that a strong representation of left-wing parties or female representatives is sufficient for the institutionalisation of equal pay regulations for women and men.

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<sup>30</sup> The assumption is the base for examining the role of unions for the institutionalisation of equal pay regulations. It does not imply that unions generally support the equality of women and men.

The outlined assumptions must be understood as expectations and not as hypotheses that are to be falsified. Instead, the aim of the analysis is to point out interrelations between the conditions in order to illustrate the equifinality as well as the conjunctural causation for explaining the outcome. This leads to new insights about the relevant actors and conditions in the context of equal pay regulations for women and men (cp. Ragin 1987, 170).

## 3.2 Analysis

### 3.2.1 Operationalization and Calibration

The first step of the analysis is the operationalization and the calibration of the outcome and the conditions. The two elements of the equal pay regulations are operationalized separately at first and then combined via the logical AND connection. Research on the equal pay regulation for women and men in OECD countries is based on the analysis of the legislative texts and surveys by the OECD (2008) and the EU (Prechal and Burri 2009).<sup>31</sup>

Table 4: Modes for Defining Equal Pay for Women and Men

Mode	Definition	Membership
(i) Equal pay (unspecified)	This mode defines equal pay for all employees without mentioning their gender. It does not establish a standard for identifying wage inequalities and wage discrimination between women and men.	0
(ii) Equal pay for equal work	This mode mentions both women and men as employees, but does not pay attention to their differences, e.g. in their occupation or their physical abilities. Women receive the same wage as men if they uphold a certain standard (Baer 2004, 72). Ignorance of the differences may serve as a legitimization of wage inequalities between women and men (Kreckel 2004, 237; Lautmann 1990, 43).	0.3
(iii) Equal pay for work of equal value	This mode mentions both women and men as employees. It is then necessary to evaluate 'work of equal value' in order to pay attention to the differences between women and men (England 1992, 190f). It allows for the identification of differences between occupations that are predominantly performed by women or men. Thus, different occupations do not necessarily lead to wage inequalities (England 1992, 304f).	1
Maximum		1

Source: Author's elaboration.

<sup>31</sup> The surveys from the OECD (2008) and the EU (Prechal and Burri 2009) cover 25 of 28 OECD countries. The information for three countries, New Zealand, Switzerland and Turkey, was obtained separately.



There are three modes of defining pay equality (see table 4): (i) A general regulation for equal pay for all employees is unspecified and neglects gender as a relevant category for wage determination. Hence, it is classified as the weakest mode to ensure equal pay for women and men (membership = 0). (ii) The ‘equal pay for equal work’ regulation mentions gender as a category, but does not pay attention to differences between women and men. Equal pay is guaranteed only if women hold up to a certain (male) standard (Baer 2004, 72). Therefore, it is classified as a weak mode to ensure equal pay for women and men (membership = 0.3). (iii) The third mode is the ‘equal pay for work of equal value’ mode where regulation allows for the identification of the differences between women and men without legitimating pay inequalities. It is classified as the strongest mode to ensure equal pay for women and men (membership = 1).

The specialized bodies are differentiated with respect to their independence from governments as well as their authority in conducting investigations and taking legal action against companies. Four types of specialized bodies are identified in the OECD countries (see table 5) (OECD 2008; Prechal and Burri 2009). The classification is based on the degree of independence and the authority of the specialized bodies to conduct investigations and deliver judgments (Schöpp-Schilling 1988, 229; Winter 1998, 330).

**Table 5: Types of Specialized Bodies for Supervising Equal Pay Law**

Types of Specialized Bodies	Definition	Membership
(i) No independence	There exists no independent specialized body for supervising compliance with the equal pay law.	0
(ii) Independence and low authority	An independent specialized body exists to supervise compliance with the equal pay law. The body only starts acting on receiving complaints from employees.	0.2
(iii) Independence and medium authority	An independent specialized body exists to supervise compliance with the equal pay law. This body has the authority to conduct regular investigations concerning wage determination in companies.	0.7
(iv) Independence and great authority	An independent specialized body exists to supervise compliance with the equal pay law. The body has the authority to conduct investigations concerning wage determination and to deliver binding judgments in case of violations of the law.	1
Maximum		1

Source: Author's elaboration.

The calibration of the outcome (Equal pay regulation) is done using the logical AND operation to connect the membership scores for each case in the two sets. Therewith, cases with high values in both sets are separated from those with a high value in only one set. Only countries with both an ‘equal pay for work of equal value’ mode and an independent specialized body for evaluating compliance are classified as having strong equal pay regulations. The calibrated fuzzy sets are presented in table 7.

The first assumption (I) refers to the membership of countries in the EU. The operationalization of the membership in the set (EU) is determined by the membership of the cases in the EU. Non-members are not parts of the set. Full membership is assigned to countries that have been EU members since 1974. The second assumption (II) examines the influence of INGOs on equal pay regulations. Full membership in the set (INGO) of countries with a strong representation of INGOs is given if at least one out of 1,000 citizens is a member in such an organization.<sup>32</sup> Non-membership is assigned to countries with less than one member per 100,000 citizens. The point of maximum indifference is stated for one member per 10,000 citizens in a country.

The impact of attitudes (Attitudes) towards gender equality is mentioned in the third assumption and is operationalized via information provided by the World Values Survey (2009) (Variable c001: "If jobs are scarce: Men should have more right to a job than women"). A majoritarian refusal of this statement within the population shows a general consent to equal treatment for women and men in the economic system.<sup>33</sup> The cases with mean scores > 2.9 are full members in the set of countries with strong attitudes towards gender equality. A mean score of 2.5 marks the point of maximum indifference.

The operationalization of the strength of women's movements (Women's movement) refers to a study by Chafetz and Dworkin (1986).<sup>34</sup> The strength of the movements is measured according to their size and visibility. Mid-sized movements are calibrated above the point of indifference, whereas small movements are assigned a membership score < 0.5.

The strength of unions (Unions) mentioned in the fifth assumption is operationalized based on their number of members (Ebbinghaus and Visser 2000, 59).<sup>35</sup> Full membership of cases in the set of countries with strong unions is assigned if more than 70% of the employees in a country are union members. The maximum point of indifference is at 30%.

The sixth assumption examines the representation of left-wing parties and women in parliament (Parliament).<sup>36</sup> Both sets are connected via an addition by

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<sup>32</sup> The INGO memberships are mean scores of the data for the years 1966, 1977, 1986, 1997 and 2000. The operationalization is based on data from the Union of International Association (2008; cp. Anheier and Stares 2002).

<sup>33</sup> 'Consent' is coded with '1,' 'Neither' receives '2' and refusal is coded with '3.' Based on this coding, the mean scores for each country were calculated.

<sup>34</sup> Chafetz and Dworkin (1986) analyse Germany, Finland, France, UK, Italy, Japan, Canada, the Netherlands, Norway, Portugal, Spain and USA. Women's movements in the other OECD countries were analysed by the author using the same methodology based on at least two case studies (Laux 2014a).

<sup>35</sup> The data were taken from the OECD (2013) for the year 2006. For Iceland, the most current available data is for the year 2002.

<sup>36</sup> The data was provided by the Inter-Parliamentary Union (2012) and for South Korea by Croissant (2001). The mean scores for each country were calculated for all available data in the period from 1970 to 2006.

presuming that both groups fulfil an equivalent function. Full membership in the set of cases with a strong representation is assigned if 60% of the seats in parliament are held by left-wing parties or 50% of women hold a seat. The point of indifference is defined at 45% of left-wing parties or 20% of women in parliament, both of which indicate that the groups' support of gender equality is sufficiently represented in parliament. All the anchors for the calibrations are summarized in Table 6.

**Table 6:** Anchors for Calibration of the Conditions

	Full Membership	Point of Indifference	Full Non-Membership	Calibration Method
(I) EU	EU member since 1974	EU member in 2006	Not an EU member	Indirect
(II) INGO	> 1 INGO member per 1,000 citizens	0.1 INGO member per 1,000 citizens	< 0.01 INGO member per 1,000 citizens	Indirect
(III) Attitudes	> 2.9 (strong agreement with gender equality in the economy)	2.5	< 1.8 (weak agreement with gender equality in the economy)	Indirect
(IV) Women's Movement	Strong	Below medium strength	None	Indirect
(V) Unions	> 70% of all employees as members	30% of all employees as members	< 10% of all employees as members	Indirect
(VI) Parliament	> 60% of left-wing parties or > 50% of female representatives	45% of left-wing parties or 20% of female representatives	< 10% of left-wing parties or < 5% of female representatives	Indirect

Source: Author's elaboration.

Table 7 presents all the calibrated fuzzy sets for the outcome and the conditions. They form the basis for the set-up of the truth table and its minimization.

**Table 7:** Calibrated Fuzzy Sets of the Outcome and the Conditions

Cases	Equal Pay Regulation (fs)	EU (fs)	INGO (fs)	Attitudes (fs)	Women's Movement (fs)	Unions (fs)	Parliament (fs)
Australia	0.2	0	0.3	0.6	0.6	0.2	0.8
Austria	0.2	0.8	0.7	0.3	0.2	0.6	0.8
Belgium	0.2	1	0.7	0.4	0.6	0.8	0.3
Canada	1	0	0.3	0.7	0.6	0.6	0.3
Czech Rep.	0	0.7	0.7	0.4	0	0.2	1
Denmark	1	1	0.7	0.9	0.6	0.9	0.8
Finland	0.7	0.8	0.7	0.8	0.6	1	0.8
France	1	1	0.2	0.4	0.6	0	0.3
Germany	0.2	1	0.2	0.3	0.6	0.3	0.8
Hungary	0.2	0.7	0.7	0.4	0	0.2	1
Iceland	1	0	1	1	1	1	0.8

*Table 7 continued...*

Cases	Equal Pay Regulation (fs)	EU (fs)	INGO (fs)	Attitudes (fs)	Women's Movement (fs)	Unions (fs)	Parliament (fs)
Ireland	1	1	0.7	0.6	0.2	0.6	0.2
Italy	0.2	1	0.2	0.3	1	0.6	0.3
Japan	0.3	0	0.2	0.1	0.2	0.2	0.3
Mexico	1	0	0.2	0.3	0.2	0.1	0.3
Netherlands	0.7	1	0.7	0.8	1	0.1	0.8
New Zealand	0.2	0	0.7	0.7	0.2	0.3	0.8
Norway	1	0	0.7	0.7	0.6	0.3	0.9
Poland	1	0.7	0.2	0.2	0	0.8	0.8
Portugal	1	0.9	0.7	0.3	0.2	0.2	0.3
Slovakia	0	0.7	0.7	0.3	0	0.3	0.8
South Korea	0	0	0.2	0.1	0	0.3	0.2
Spain	0	0.9	0.3	0.4	0.2	0.2	0.3
Sweden	1	0.8	0.7	1	0.2	1	0.9
Switzerland	0.2	0	0.7	0.3	0.2	0.2	0.3
Turkey	0	0	0.2	0	0.2	0	0.3
UK	1	1	0.2	0.4	0.6	0.4	0.8
USA	1	0	0	0.8	1	0.1	0.1

Source: Author's elaboration.

### 3.2.2 Solution Terms

The analysis of necessary conditions is conducted before the minimization of the truth table. It reveals that neither of the conditions is necessary or trivial.<sup>37</sup> Analysis of the sufficient conditions is conducted by using the two-step approach, which makes it possible to distinguish between remote and proximate conditions in order to solve “the well-known problem of ‘too many variables and too few cases’” (Schneider and Wagemann 2006, 756).<sup>38</sup>

In the first step, three remote conditions (EU, Attitudes, INGO) are analysed.<sup>39</sup> The solution presents one ‘outcome-enabling condition’ (Schneider and Wagemann 2006, 761): *Attitudes*. This condition is included in the second step along with the three proximate conditions (Women’s movements, Unions, Parliament).<sup>40</sup> The

<sup>37</sup> The analysis is conducted by using the fs.QCA 2.5 program (Ragin and Davey 2009).

<sup>38</sup> Remote conditions are structural factors that are ‘relatively stable over time,’ whereas proximate conditions mark actors. The two-step approach allows one to study the interrelation of structure and agency (Schneider and Wagemann 2006, 760).

<sup>39</sup> Table A in the appendix shows the truth table. 7 out of 8 logical possible conjunctions can be found empirically. The thresholds for the selection of the conjunctions were 0.7 for the consistency score and 0.6 for the PRI score and the analysis is conducted by using the most parsimonious solution.

<sup>40</sup> Table B in the appendix shows the truth table. In this second step, 13 out of 16 logical possible conjunctions also exist empirically. To select the conjunctions, a consistency threshold of 0.75 and a PRI threshold of 0.61 were applied. The solution terms present the inter-

analysis reveals that two combinations of conditions are sufficient for explaining a strong equal pay regulation in a country (see table 8). Both solution terms are equifinal and have a similar explanatory power for the outcome.

**Table 8:** Sufficient Solution Terms for Strong Equal Pay Regulation

Solution Terms	(1) Women's movement * ~Unions	(2) Unions* Attitudes
Countries	UK, Netherlands, USA, Australia, France, Germany, Norway	Denmark, Iceland, Sweden, Finland, Canada, Ireland
Raw Coverage	0.41	0.53
Unique Coverage	0.18	0.30
Consistency	0.77	0.84
Solution Coverage	0.71	0.71
Solution Consistency	0.80	0.80

Source: Author's elaboration.

The first solution term (1) reveals that a strong women's movement in combination with weak unions is sufficient for a strong equal pay regulation for women and men in a country. The second solution term (2) points out that strong unions in combination with strong attitudes towards gender equality are sufficient to explain the outcome. Both solutions are outlined in the following chapter (see 3.3).

The two solution terms cover 71% of the countries with a membership in the outcome set > 0.5 (solution coverage). They explain 80% of the outcome (solution consistency). Two cases, Germany and Australia, are not described by either one of the solution terms and are thus deviant cases for consistency. On the other hand, Poland, Mexico and Portugal have a membership score > 0.5 in one of the sets of the solution terms, but lack a membership in the outcome set > 0.5. Thus, they are deviant cases for coverage and are not explained by one of the solution terms.

### 3.3 Results

The reconstruction of the solution terms is based on typical cases. The aim is to capture the conjunctural and sequential causalities of the conditions in order to identify the mechanisms for a strong equal pay regulation. Both mechanisms are equifinal for explaining equal pay regulations as legal innovations. Two typical cases were chosen: UK is the typical case for reconstructing the first solution (Women's movement \* ~Unions), whereas Denmark offers further insights into the second solution (Unions \* Attitudes).

- 1) The interplay of a strong women's movement with weak unions as an explanation for a strong equal pay regulation (The case of the UK)

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mediate solutions. The directional expectation was that the attitudes towards gender equality (Attitudes) foster the institutionalisation of equal pay regulations.

The strong equal pay regulation in the UK dates back to the Equal Pay Act (1970) and the Sex Discrimination Act (1975) (Lovenduski and Randall 1993, 188).<sup>41</sup> The Equal Pay Act introduced the 'equal pay for work of equal value' mode and the Sex Discrimination Act established an Equal Opportunity Commission (EOC) as an independent specialized body with great authority in the UK (OECD 2008).

The women's movement in the UK was the major actor for the institutionalisation of the strong equal pay regulation (Cohen 2012, 63; Gelb 1986, 108). The significance of weak unions becomes clear on examining their relationship with the women's movement. The influence of the women's movement on the unions was marginal although some of their activists also were union members (Gelb 1986, 107). The union's politics focused on their male members, which made the women's movement the key representative for the interests of working women (Gelb 1986, 103ff).

The origin of the strong equal pay regulation lies in the Ford sewing machinists' strike of 1968 (Cohen 2012, 51). It emerged because of a new job evaluation, negotiated between unions and employers, which discriminated against female workers. The strike gained much attention and spread to other factories undergoing similar job evaluations. It was supported by the women's movement and, subsequently, equal pay for women became one of their key issues (Cohen 2012, 52f, 63). The protest of the female workers and the women's movement addressed the political class, which led to the enactment of the Equal Pay Act (1970) (Cohen 2012, 63). Major sections of the Labour Party supported the Equal Pay Act but had not been able to enact an equal pay regulation because of their close connection to the unions (Lorwin and Boston 1984, 144).

The enactment of the Equal Pay Act did not end the protest of the women's movement. In 1970, the National Joint Action Campaign Committee for Women and Equal Rights (NJACCWER) was founded to intensify the pressure on politics to regulate wage determination more thoroughly (Lovenduski and Randall 1993, 180f). Public pressure and the lobbying of the NJACCWER strongly influenced the enactment of the Sex Discrimination Act, which established the Equal Opportunity Commission (EOC) as an independent specialized body with great authority. The EOC consists of representatives from employers, unions and women's rights organizations (Lovenduski and Randall 1993, 181ff).<sup>42</sup> The EOC limited the autonomy of collective bargaining in order to prevent inequalities due to gender.

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<sup>41</sup> Subsequently the Equal Pay (Amendment) Act (1984) completed the equal pay regulation. It defines the standards for ensuring the comparability of the 'equal pay for work of equal value'. The EOC together with the unions were responsible for the enactment of the Equal Pay (Amendment) Act (Conley 2014, 313).

<sup>42</sup> In 2007, the EOC changed its name to the Equality and Human Rights Commission.

The reconstruction points out that the women's movement was crucial for the institutionalisation of the strong equal pay regulation, which confirms the assumption about social movements as 'entrepreneurs' for innovations (Schumpeter 1952, 116; cp. Eder 2000, 184; Kern 2008, 15).<sup>43</sup> The connectedness of the women's movement with other civil society organizations placed the issue of unequal pay on the agenda of politics and legislation. Therewith, civil society influenced politics and economy by enacting a legal innovation (Alexander 2006, 205ff). The women's movement was in charge both of the labelling and the institutionalisation of the strong equal pay regulation as a legal innovation. Its strength can also be attributed to the inactivity and the weakness of the unions to represent the interest of female workers. This supported the mobilization of the women's movement and indirectly fostered their impact on the public and on politics (Siim 2000, 95). The reconstruction of the solution term illustrates this sequential causality of the two conditions.

2) The interplay of strong unions and attitudes supporting gender equality as an explanation for a strong equal pay regulation (The case of Denmark)

The movement for a strong equal pay regulation in Denmark dates back to the collective bargaining between unions and employers at the beginning of the 1970s. The results of the bargaining built the foundation for the legal innovation to ensure equal pay for women and men (Foged et al. 1984, 50). It was enacted through the Equal Pay Act (1976) and the Gender Equality Board (OECD 2008).

The unions were the major actors for ensuring the equality of women and men in Denmark and they were closely connected to the Labour Party and the women's movement (Foged et al. 1984, 46). The federation of labour unions in Denmark was strongly influenced by the female workers union (KvindeligtArbejderforbundiDanmark (KAD)), which led to the addressing of gender equality and equal pay in collective bargaining (Foged et al. 1984, 52; Rosholm and Smith 1996, 258). The unions' commitment to equal pay can be attributed to the strong women's workers' union as well as the high number of female union members and was ensured by the attitudes within the population supporting gender equality. In Denmark, there was hardly any controversy about the principle and necessity of equal pay for women and men and all parties supported the equal pay regulation (Skjeie and Siim 2000, 346; Dahlerup 1986, 228f).

The interplay of unions as actors and attitudes supporting gender equality led to the enactment of a strong equal pay regulation (Siim 2000, 132f). Together they put pressure on politics, especially on the Labour Party, to enact the legal innovation. The strong equal pay regulation for women and men is also compatible with the Danish welfare policy, which has been characterized by extensive labour laws (Dahlerup 1986, 241).

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<sup>43</sup> 'Entrepreneurs' are defined by their capability to implement innovations (Schumpeter 1952, 116).

The strong equal pay regulation for Denmark was first created through collective bargaining at the beginning of the 1970s. It was a consequence of the growing awareness among unions of the problem of pay inequalities between women and men. Its labelling as a solution to the problem of unequal pay was then picked up by the parliament. The reconstruction illustrates the conjunctural causation of the two conditions of the solution term. That points to the contingent engagement of unions towards gender equality, which depends on the social context and their membership structure (Becker 1971, 62; Kreckel 2004, 276). As a result, unions were not forerunners for equal pay regulations, but responded to unequal pay for women as a social problem. This marks the distinction between unions and the women's movement as representatives of women's interests.

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#### 4. Conclusion and Outlook

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The conclusion first captures the results of the presented analysis in order to illustrate QCA's strengths for analysing the institutional conditions for innovations. Afterwards the general features of QCA are summarized to stress its appropriateness as a method for innovation research and as an autonomous approach next to qualitative and quantitative methods.

The analysis showed that two combinations of conditions are sufficient to explain strong equal pay regulations in OECD countries. The results highlight two of the crucial features of QCA: its capability to identify equifinal explanations for an outcome and to capture the interrelation of the conditions. A strong equal pay regulation is either caused by the impact of women's movements, who gain their strength in contrast to weak and passive unions in matters of gender equality, or goes back to unions, who act on behalf of an overall societal consensus about the necessity of gender equality. The results illustrate the importance of capturing the interdependence of structure and action for identifying mechanisms. They also show the ambiguity of unions as actors for or against gender equality which can be at least partly explained by referring to their social context. The results of the comparative analysis of the institutional conditions of equal pay regulations are completed with the reconstructions of two typical cases that illustrate the plausibility of the results as well as the sequential and conjunctural interrelations of the conditions.

As a method for innovation research, QCA offers a unique perspective on the institutionalisation of innovations: Based on set-theoretic assumptions and the principles equifinality, conjunctural causation and asymmetry, QCA makes it possible to capture the context-sensitivity and contingency of innovation processes. The identification of an innovation ex-post is the starting point for the comparative analysis. Subsequently, the results of the comparative analysis provide the frameworks for conducting in-depth analyses of typical cases for each solution term. The reconstruction of the typical cases offers the possibility to connect



the ‘grammar’ of innovation processes with the ‘pragmatics’ and ‘semantics’ (Hutter et al. 2015). Therewith, QCA bridges the methodological divide between qualitative and quantitative methods in innovation research in order to gain a broader and more diversity-oriented perspective on the institutionalisation of innovations. Furthermore, QCA helps discover deviant cases, which are either forerunners or deniers of innovations and are thus probably interesting cases for further inquiries (Schneider and Rohlfing 2013).

As mentioned before, the aim of this article was not to present QCA as a better or more sophisticated method for innovation research. Instead its approach may offer interesting insights into innovation processes. QCA avoids treating cases as idiosyncrasies or generating oversimplified explanations of social phenomena. Compared to the qualitative and quantitative methods, QCA’s benefit consists in its diversity orientation, which moves “between complexity and generality” (Ragin 2000, 21). Its basic principles ensure the suitability for the contingent and manifold social reality, which challenges social research.

28 years after its invention, QCA has been implemented in political science, sociology and organization studies. It offers interesting insights for innovation research, which may enrich the study of innovations and foster the development of theories of innovation.

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## Appendix

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**Table A:** Truth Table of the First Step of the QCA Analysis (Remote Conditions)

Combination	EU	Attitudes	INGO	Number	Equal Pay Regulation	Consistency	PRI
1	1	0	1	6	0	0,52	0,34
2	1	0	0	6	0	0,61	0,48
3	1	1	1	5	1	0,77	0,69
4	0	0	0	4	0	0,50	0,35
5	0	1	1	3	1	0,71	0,62
6	0	1	0	3	1	0,72	0,63
7	0	0	1	1	0	0,57	0,34
8	1	1	0	0	?		

Source: Author's elaboration.

**Table B:** Truth Table of the Second Step of the QCA Analysis (Proximate Conditions)

Combina-tion	Attitudes	Unions	Parliament	Women's Movement	Number	Equal Pay Regulation	Consistency	PRI
1	1	0	0	1	1	1	0,89	0,83
2	1	1	1	1	3	1	0,88	0,83
3	1	1	0	1	1	1	0,84	0,72
4	1	1	0	0	1	1	0,84	0,73
5	0	0	0	1	1	1	0,83	0,70
6	1	0	1	1	3	1	0,81	0,70
7	1	1	1	0	1	1	0,80	0,70
8	0	0	1	1	2	1	0,76	0,61
9	0	1	0	1	2	0	0,72	0,48
10	0	1	1	0	2	0	0,72	0,58
11	1	0	1	0	1	0	0,63	0,49
12	0	0	0	0	7	0	0,59	0,47
13	0	0	1	0	3	0	0,55	0,39
14	0	1	0	0	0	0		
15	0	1	1	1	0	0		
16	1	0	0	0	0	0		

Source: Author's elaboration.