

# WORKER RIGHTS IN COLLECTIVE BARGAINING

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## Abstract

This paper uses a legally grounded natural-language pipeline to analyze the empirical determinants and economic importance of worker rights in 32,402 Canadian collective bargaining agreements from 1986–2015. We parse legally binding rights (e.g., “workers shall receive...”) and obligations (e.g., “the employer shall provide...”) from contract text, and validate our measures through evaluation of clause pairs and comparison to firm surveys on HR practices. Using time-varying province-level variation in labor income tax rates, we find that higher taxes increase the share of worker rights clauses while reducing pre-tax wages among unionized workers, consistent with a substitution effect away from taxed wages toward untaxed rights. Combining estimates, we find that a one-standard-deviation increase in worker rights corresponds to about 3% to 8% of wages in compensation-equivalent terms.

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# 1 Introduction

Labor economists have long been interested in the effects of collective bargaining agreements (CBAs) on wages and benefits (e.g. Farber et al., 2021; Martins, 2021; Card and Cardoso, 2022; Jäger et al., 2025). Yet CBAs are about much more than worker compensation, often extending across dozens of pages, with hundreds of legally binding plain-text clauses to go along with lists of positions and tables of wages. Is this text merely “cheap talk”? That is to say, are legal rights ancillary to wages and enumerated benefits, or do they have economic value to workers and firms? Drawing on legal theory and tools from unsupervised natural language processing, this paper measures and empirically studies the legal content of CBAs.

Our analysis of the full legal content of CBAs builds on early work in labor economics arguing for a broader role of CBAs beyond wages and employment (Freeman and Medoff, 1984; Farber, 1986). This additional text in CBAs governs a wide range of workplace rights and responsibilities. To motivate and interpret this legal content, we draw on the property-rights theory of the firm, which highlights how ownership and control are defined by the inability to commit and the allocation of residual decision rights (Grossman and Hart, 1986; Hart and Moore, 1990).<sup>1</sup> In particular, when workers have superior information about an activity that is only realized after contracting, then it may be efficient to allocate decision rights to workers (Aghion and Tirole, 1997). There is also work in behavioral economics showing that workers get direct utility from having control rights, and hence are willing to pay for such rights (Bartling et al., 2014). From this perspective, worker rights clauses are not peripheral; they are legal instruments that reallocate authority within the firm. This reallocation can increase worker welfare and enhance productive efficiency. Our goal is to study empirically how economic conditions shape the prevalence and value of these rights.

To recover worker rights from contract text, we combine ideas from computational linguistics with canonical legal semantics of rights and duties (Hohfeld, 1913). Motivated by long-standing connections between formal grammar and legal theory (Lindahl, 1977), we take a structural, rather than purely data-driven, approach to measuring the legal content of contracts. Our method begins by constructing depen-

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<sup>1</sup>The importance of control rights for understanding employment goes back to the classic theories by Simon (1951) and Alchian and Demsetz (1972).

dependency trees for each sentence, parsing contractual clauses into linguistic primitives of subjects, verbs and objects. A sentence’s verb structure, especially deontic modal verbs like “shall” or “may” (Von Wright, 1951; Kratzer, 1991), determines whether a clause is a right, permission, obligation, or prohibition. The sentence’s subject determines whether the clause applies to workers, unions, employers, or managers. For example, “employees shall receive...” indicates a worker right, while “the employer shall provide...” indicates a firm obligation. We then reduce the dimensionality of the remaining text of the clause (i.e. the sentence’s object) by computing sentence vectors and grouping them into topics via a clustering algorithm. Our approach combines this structural analysis of legal language with new algorithmic techniques to systematically measure the legal content of CBAs.

Our methodology offers a number of practical advantages. The large number of clauses with complex structures and contingencies makes coding each clause by hand very difficult. Further, the common statistical measures of text constructed from word counts, n-grams, or language embeddings do not work well in our setting because they miss small differences in language such as negation (Hossain et al., 2022) and modality (Park et al., 2025) that would radically change the legal meaning of a clause: For example, replacing “shall” with “shall not”, or replacing “may” with “must.” Our structural approach to text analysis adapts innovations in dependency parsing to construct grammatically precise representations of natural language (Ash et al., 2020). These grammatical structures are particularly important for extracting legal guarantees (Solum, 2013; Solan, 2018), versus say political or media content (Gentzkow and Shapiro, 2010), or language in job postings (Atalay et al., 2020) or employee reviews (Sockin, 2022). In short, this structural approach to contracts is scalable, transparent, reproducible, and interpretable, and it could be adapted to many legal domains.<sup>2</sup>

The approach is implemented with a new corpus of 32,402 collective bargaining agreements from Canada, 1986-2015. Canada is ideal for our purposes because it has decentralized firm-level bargaining, substantial province-level regulatory variation, and a large administrative corpus of contract text. While many countries have high union coverage and large collections of collective agreements, their bargaining systems often feature a hierarchy of agreements negotiated at the firm, sector, and

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<sup>2</sup>In Appendix Section A.3.3, we provide a longer discussion of the merits of the structural approach, including a comparison to potential LLM-based approaches.

national levels. These features can make it difficult to identify the provisions binding a particular establishment. Employment law and collective-bargaining institutions also vary across countries, affecting the scope and content of collective agreements (e.g. Botero et al., 2004). Canada’s decentralized system makes firm-level collective bargaining agreements particularly important legal documents and allows us to study their content systematically.

The NLP pipeline extracts rights and duties for workers and firms, and then we link them to metadata for empirical analysis. Descriptively, we see that a contract’s legal content covers diverse topics and actions. Canadian labor contracts consist mainly of worker rights, worker obligations, and firm obligations. The standard non-wage benefits discussed in previous work (e.g. Freeman and Medoff, 1984; Budd, 2017; Corradini et al., 2025), such as vacations and pensions, are provided through worker rights clauses entitling workers to these benefits. More generally, worker rights include a diverse set of legal entitlements defining benefits, workplace conditions, domains of control, and procedures for workplace governance. Such procedures structure decision-making around scheduling, dismissal, seniority, and dispute resolution, for starters. Some provisions (e.g. seniority) benefit one group of workers to the potential detriment of another group of workers.

Worker rights are legally enforceable claims, so they should matter a great deal to both firms and workers. As a result, CBA rights are intensely bargained over by highly paid, well-trained lawyers and negotiators, a point repeatedly made in the extensive literature on collective bargaining (McAlevey and Lawlor, 2023; Slichter et al., 1960).<sup>3</sup> As further substantiation of our measure of worker rights, we test whether it indeed captures what is important to workers through a series of quantitative validation exercises. An open-weights large language model (LLM) is used to rank clause types through pairwise comparisons based on how beneficial they are to workers. To validate the LLM rankings, we compare Gemma’s choices with 160 annotations from legal experts who hold or are completing a J.D. Gemma selects the opposite clause in only 11.3% of comparisons overall and 9.5% of comparisons involving a worker-rights clause. On twice-annotated pairs for which the experts agree, the opposite-clause rate falls to 4.8%. Worker-rights clauses have the highest pro-worker selection rate for both LLM and human-expert annotations. Further, the share of worker rights

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<sup>3</sup>A qualitative account of the costs of union bargaining, and the emphasis on contract language for seniority and scheduling, is provided in Chapter 5 of Getman (2018).

in a union contract is correlated with pro-worker dimensions of the associated firm’s human resource practices, as measured in the World Management Survey (Bloom et al., 2012). Other clause types are either uncorrelated or negatively correlated with pro-worker HR practices.

The next step is the empirical analysis of the determinants of the prevalence of worker rights in union contracts. Gruber and Poterba (1994) have shown that taxes increase health benefits relative to wages for self-employed individuals. Hence, to the extent that union workers value these rights, Gruber and Poterba’s result suggests that the prevalence of worker rights clauses should increase in the tax rate on wage income. We estimate the effect of provincial effective labor income tax rates on the prevalence of worker rights by exploiting the predetermined schedule of contract expirations, with controls for a rich set of covariates, including other provincial labor laws, and province-sector and sector-year fixed effects.

We find that tax increases lead to an increase in worker rights clauses. That is consistent with a substitution effect away from taxed compensation (income) and toward untaxed compensation (rights). The result holds in a staggered event-study design and is robust to a number of alternative specifications, including the addition of firm fixed effects, union fixed effects, and province-specific time trends. It also holds in an IV specification in which we isolate exogenous changes in *province* income tax through changes in *federal* tax rates and associated deductions/credits (Gruber and Saez, 2002; Akcigit et al., 2021). Notably, the tax effect is not uniform across types of rights: topic-level analysis shows particularly strong responses for clauses related to scheduling and health and well-being. Moreover, while the tax effects are larger in the public sector, the same qualitative patterns persist in the private sector, reducing concern that the baseline result is driven entirely by public-sector fiscal feedback or governments’ dual role as tax setters and employers.

Overall, the evidence is consistent with worker rights behaving like non-wage compensation. We contribute to the empirical amenities literature by exploiting variation in provincial income taxes to estimate the effect of taxes on different topics of worker rights. We find that the largest effects are on scheduling and other rights around time use. Next, we distinguish among different forms of worker rights, including rights that differ in their importance to workers, as well as quantitative and qualitative rights. We find similar effects across these heterogeneous categories of rights. More broadly, we distinguish between wage-like benefits, such as health coverage or

bonuses, and unpriced control rights, such as scheduling flexibility and termination protection, which are typically hidden in contract text and overlooked in standard quantitative datasets. We find that policy effects on control rights are almost as strong as those on priced benefits.

These results contribute to the literature on the employment contract. Our results show that unions can add value by negotiating and enforcing contract terms that are effectively options contracts; they provide value only if an event comes to pass, for example if a dismissal is unfair. Hence, like option contracts in finance, they are generically hard to price. Unions that represent a large body of workers have experience with these events, and hence they are able to negotiate terms that we show have value, but are otherwise difficult to price.<sup>4</sup> These terms are captured through a structural analysis of the contract text, which is essential for identifying the full range of contractual provisions that matter to workers.

How economically important are these rights? We find that income tax increases raise pre-tax wages among non-unionized workers, whereas the estimated wage response among unionized workers is negative. This pattern is consistent with union contracts adjusting the mix of wages and contractual rights in response to tax changes. Holding worker utility constant, comparing the tax-induced responses of wages and worker rights provides a reduced-form, compensation-equivalent scaling of worker rights intensity. Across alternative wage measures and worker rights specifications with and without firm fixed effects, a one-standard-deviation increase in worker rights corresponds to approximately 3–8% of wages. We interpret this range as an order-of-magnitude estimate for the marginal unionized bargaining unit rather than as a structural willingness-to-pay.

These findings add to the longstanding literature on collective bargaining and unions (Freeman and Medoff 1984; Farber 1986; MacLeod 2011; Cazes et al. 2019). There has been a recent resurgence of interest from both policymakers and academics on the economic effects of unions and collective bargaining on wages and employment in a variety of countries and contexts, often using administrative data (Card and Cardoso, 2022; Jäger et al., 2025). While the union effect on productivity is ambiguous (Doucouliagos and Laroche 2003, 2009; DiNardo and Lee 2004; MacLeod 2011), in the U.S. and Canada, unions have historically been an important force in compressing

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<sup>4</sup>Appendix C has a fuller discussion of this point, and provides a model that motivates the regressions we run.

the wage (and income) distribution (DiNardo et al., 1996; Card, 2001; Farber et al., 2021).<sup>5</sup>

We also add to the broad literature in labor economics on the non-wage aspects of employment. Those include on-the-job amenities (Lavetti, 2023), such as the ability to work from home (Bloom et al., 2015; Mas and Pallais, 2017, 2020; Cai and Wang, 2022). The existing literature views amenities from the perspective of the Rosen (1986) model of hedonic pricing, recently augmented to incorporate imperfect competition in the labor market (Mas, 2025). This approach supposes that an amenity is a commodity that workers can easily value, that in turn is used by workers to assess job offers.<sup>6</sup> As a result, detailed measures of non-wage employment conditions have largely come from surveys and cover only a relatively narrow set of dimensions (Dube et al., 2022; Maestas et al., 2023). We show that one can use the text of collective bargaining agreements to inductively measure a larger and more comprehensive set of worker rights backed by legal commitments. As we highlight in our discussion, the right to a benefit is conceptually distinct from the benefit itself, as failure to supply the benefit imposes legal costs for breach.

Methodologically, getting at the granular textual details of contracts is the core of this research. It builds on work applying computational techniques from natural language processing to the text of written contracts (Sanga, 2014; Moszoro et al., 2016; Ganglmair and Wardlaw, 2017), which in turn is part of a growing area of empirical research using text data by economists and other social scientists (Roberts et al., 2013; Gentzkow et al., 2019; Ash and Hansen, 2023). In labor economics, recent work using topic models to analyze contract features includes Lagos (2025) and Corradini et al. (2025). Using concepts from formal legal linguistics, in combination with recent advances in natural language parsing and transformer-based semantic encoders, we

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<sup>5</sup>Other related work includes the hysteresis in contract terms documented in Card (1986), suggesting that observed union contracts cannot be viewed as achieving the first best. There is also a large literature in labor and legal history, sociology, and political science concerned with the interaction of labor laws and labor contracts. Research that focuses on hand-coded features of union contracts includes Juravich et al. (2006) and Strunk and Grissom (2010). Stepan-Norris and Zeitlin (2003) argue that certain contract provisions, such as strong stewards, were a key distinctive demand of particularly politicized unions in the post-war period. McCammon (1990) and Pope (2004), among others, have argued that court interpretations of the Wagner Act have been decisive in weakening the strike provisions in contracts.

<sup>6</sup>It is worth highlighting the early paper by Currie et al. (2005) that shows that contracts can also be a non-amenity when there is monopsony power. They find that when the market power of hospitals in California increased, the hospitals responded to their increase in labor market power with an increase in workload for nurses, rather than a wage drop.

are able to evaluate the legal incidence of contractual language on different parties to the contract (see Ash et al., 2020). This approach allows one not only to recover legally meaningful linguistic patterns in a systematic and reproducible way, but also to connect them to economic models for theoretically grounded empirical analysis.

The rest of the paper is organized as follows. Section 2 provides an institutional background and outlines the data sources. Section 3 describes the text data and methods used to extract relevant clauses. Section 4 provides evidence validating our measure of worker rights. Section 5 outlines the econometric approach and reports the empirical results on how rights respond to tax changes. Section 6 concludes.

## 2 Background

This section first provides an institutional background on collective bargaining and unions in Canada. Second, it outlines the data sources.

### 2.1 Collective Bargaining in Canada

Canadian collective bargaining has several attractive institutional features for our setting. Across Canada, including Quebec, provincial and federal collective-bargaining regimes are modeled on the U.S. Wagner Act, with exclusive union representation and bargaining typically organized at the firm or establishment level (Martin and Vallée, 2017).<sup>7</sup> Bargaining is decentralized, with little scope for automatic contract extensions to non-union members (Jäger et al., 2025). Further, and perhaps most importantly, Canada has a large administrative database of collective bargaining agreements available for use by researchers.

A considerable literature in economics and industrial relations has studied Canadian labor market institutions and their differences with the U.S. (Card and Freeman 1993, Card et al. 2004, Card et al. 2020). Eidlin (2018) provides a recent account of the historical origins and the political economy of the divergence between U.S.

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<sup>7</sup>Quebec’s background private law follows the civil-law tradition, whereas the other provinces generally follow common law, but collective-bargaining institutions do not divide neatly along this line. Martin and Vallée (2017) show, for example, that seniority and just-cause clauses constrain employer discretion over layoffs and termination under both Quebec and federal law. Because our text analysis is restricted to English-language contracts, it excludes most Quebec agreements, and our estimates principally reflect agreements from the common-law provinces.



and Canadian labor union density.<sup>8</sup> While Canada has maintained a higher union density than the U.S. (about 30%, compared to about 10%), the process of collective bargaining is still somewhat similar between the two nations.

In Canada, collective bargaining is regulated at the “jurisdiction” level, where in most cases the relevant jurisdiction is the province. Labor law includes rules on the process of union recognition (card check vs. secret ballot election), for example, and restrictions on replacing striking workers. Many provinces also have “mandatory arbitration” where disputes between unions and employers are automatically referred to a labor tribunal, while other provinces allow alternative dispute resolution processes, e.g. mediation, before the case goes to an arbitrator.<sup>9</sup> Overall, this means that there is important variation in labor policies across provinces. Further, contracts are negotiated at the firm level by local union representatives. Those local unions bargain around and in response to local provincial rules and policies. This is unlike many European contexts, where the national unions hold a large influence even over local bargaining matters, for example by setting agreements that cover entire sectors.

Collective bargaining agreements are legally binding contracts with meaningful sanctions for breach. However, there are some restrictions on what can be put in a contract. For example, there are basic rights in employment law and in the broader Charter of Rights and Freedoms that cannot be abrogated by a collective bargaining agreement. Further, there are unwritten “implied obligations”, for example that employers are not to harass and workers are not to shirk. These also vary by jurisdiction. This baseline of statutory employment standards applies to union and non-union workers alike, and non-union workers may obtain additional protections through individual employment contracts or, especially in larger firms, employee handbooks. What distinguishes collective agreements is that they record a comprehensive, jointly negotiated, and grievance-enforceable set of worker rights in a single text that is systematically collected, making them uniquely suited to measuring contractual rights at scale.

A core issue in interpretation of the language of collective bargaining agreements is whether or not the employer has residual control rights, as is the case under Canadian

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<sup>8</sup>Kuhn (1998) reviews the empirical evidence on the productivity of unions in Canada. His evidence suggests that public sector unions in Canada reduce productivity, but there is little evidence of this for private sector unions.

<sup>9</sup>Legree et al. (2017) provide a summary of provincial collective bargaining regimes and show that these have significant, if small, effects on unionization rates.

common law (originating with British Master and Servant law), and consistent with the property-rights approach to the theory of the firm (Grossman and Hart, 1986). In an influential law review article written before he became a justice on the Canadian Supreme Court, Bora Laskin (1952) distinguished the collective bargaining regime from the common law regime. Collective bargaining agreements are treated more in line with civil law norms, where disputes rely upon the text of the agreement (Brown et al., 2019). This in turn implies that parties prefer more specific, and hence longer contracts (Doorey 2020). In particular, if a right has not been specifically provided, then workers cannot claim that right. Further, any limitations or contingencies on rights have to be explicitly contracted upon, suggesting that worker obligations should also increase with worker rights.

From the perspective of both workers and firms, a notable distinction among the granted provisions is between priced and unpriced rights. That is, contracts could grant wage-like benefits, such as vacations and health benefits, or else provisions around control and governance, such as scheduling and grievance procedures. In Canada, as in other contexts, significant bargaining energies are invested in negotiating both types of rights.<sup>10</sup>

## 2.2 Data Sources

Our data source for Canadian contracts is the Negotech database maintained by Employment and Social Development Canada (ESDC), an administrative digital library of collective agreements rather than a designed probability sample. ESDC describes Negotech as containing “copies of federal and provincial jurisdiction collective agreements” received by the Canada Labour Program from unionized organizations, including renewals for the same bargaining parties.<sup>11</sup> From this corpus we obtain more

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<sup>10</sup>A notable feature of the Canadian case is that, unlike the USA, workers in Canada are on government-provided healthcare plans. As Gruber and Poterba (1994) show for the U.S. case, workers care a great deal about health care benefits, and hence they are a central feature of U.S. collective bargaining agreements. Since healthcare is not on the bargaining table in Canada, the collective bargaining agreements can focus on other issues, including the allocation of decision rights.

<sup>11</sup>For federally regulated agreements, this receipt-based collection is reinforced by a statutory filing obligation: section 115 of the Canada Labour Code provides that “[e]ach party to a collective agreement shall, forthwith on its execution, file one copy of the collective agreement with the Minister.” The corpus should therefore be interpreted as a repository of agreements filed with or otherwise received by the federal labour program, not as a random sample or necessarily complete census of all Canadian CBAs; in particular, the employee-count thresholds used in some other ESDC collective bargaining products should not be assumed to define inclusion in Negotech itself.

than 32K contracts in the English language for the years 1986 through 2015 (after removing about 10K French-language contracts), along with metadata (company, year, etc.) by contract.

Our data have 32,402 contracts, 7,572 companies (~4 contracts per company), 10 provinces and 3 territories (which we collectively refer to as provinces), 11 sector/industry groupings, and 606 industry codes (NAICS codes).<sup>12</sup> Appendix Table A.1 reports summary tabulations for the provinces and sectors. Quebec has relatively few contracts in our sample because most of them are in French and thus excluded.

For each contract, we have the company, union, location, sector, public/private status, and number of employees. We have a set of related dates (signing, effective, and expiry), which allows us to compute contract duration, and match up to short-term changes in economic conditions.

Table 1 provides summary statistics on these variables. Appendix Figure A.1 provides histograms for a selection of the real-valued variables. About half of the firms are in the private sector. The number of employees and contract length are widely dispersed. Contract durations vary widely - from less than a year to as long as 20 years in exceptional cases - reflecting the absence of a legal limit on the length of CBAs. The average duration is around 3 years, with notable bunching at 12-month intervals. A good number of firms have COLA clauses.

Next, we have data on the implicit personal income tax rate, by province and year, from the Center for the Study of Living Standards.<sup>13</sup> In addition, we have local labor market data including employment rates from the Canadian Labour Force Survey. Summary statistics for these data are reported in Table 1.

From the Canadian Labour Force Survey, we also have access to a dataset of working-age residents in Canada aged 15 and above. We have information on their wages and union status alongside province, sector, and occupation. Our sample contains more than 4 million workers surveyed between 1999 and 2006 (before the start of financial crisis). We use the data to analyze the effects of taxes on wages.

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<sup>12</sup>Provinces exercise constitutional powers in their own right, the territories exercise delegated powers under the authority of the Parliament of Canada. Throughout the paper, provinces and territories are treated the same and referred to as provinces.

<sup>13</sup>Available at <http://www.csls.ca/reports/csls2011-17appendixtables.pdf>. This is the implicit personal income tax rate by province, computed from income tax revenues as a share of income. Union-worker earnings are 1.5 times that of non-union workers, and tend to locate in the middle income tax brackets. Appendix Figure A.2 presents the average tax rate overall and separately for each province over time.

We supplement these survey measures with wages extracted directly from the CBAs. Wage schedules appear in heterogeneous, often scanned tables and report wages in different units and occupational categories, so we developed an LLM-based extraction procedure using GPT-5-mini. The model identifies the pages containing wage tables, extracts the wage information, and harmonizes hourly, monthly, and annual wages, absolute levels and relative increases, and wages for different occupational groups into average annual wages for each contract. We retain only high-confidence extractions, which cover 33.7% of contracts after dropping outliers. LLM-extracted wages correlate with manually extracted wages for 200 contracts at 0.61 (Appendix Figure A.5) and with province-occupation-year LFS market wages at 0.50 (Appendix Figure A.15).

### 3 Measuring Rights and Obligations in Contracts

This section describes our methods for measuring features of union contracts from the texts of the agreements. We begin by describing our framework for estimating rights and obligations, and then describe the details of how we process the contracts. The data pipeline is an updated version of Ash et al. (2020).

#### 3.1 Rights, Obligations, and Modal Verbs

There is a growing body of evidence that workers value non-wage parts of the contract such as flexible scheduling and dignity at work (Chen et al., 2019; Corradini et al., 2025; Dube et al., 2022). Unionized workers are assured of receiving such rights by the text in collective bargaining agreements. Firms and unions expend significant time, money, and energy in contract drafting, including the expensive expert services of labor lawyers to ensure that the text of these contracts is enforced (see Ashenfelter et al., 2013).

Our approach is to use contract text to measure the level of worker rights. There are a number of techniques that one could use to extract a “pro-worker” dimension from contracts (Gentzkow et al., 2019; Grimmer et al., 2022; Ash and Hansen, 2023). We take a structural approach to text: a linguistically informed parser-based method combining legal knowledge and grammatical structure to extract pro-worker clauses that provide worker rights. In Appendix Section A.3.3, we discuss the advantages

of our method over other available methods, including dictionary-based methods, supervised machine learning, and large language models.

Our approach draws from classic ideas in legal theory that map linguistic indicators to associated legal rights and duties (Hohfeld, 1913; Markovich, 2020). We focus on modal verbs, which play a pivotal role in legal language. Modal verbs express a necessity or possibility: “it must be that X” or “it may be that X”. Modal verbs can be either epistemic or deontic. Epistemic modal verbs have to do with what is entailed about the world (e.g. based on logical inference or evidence). In the terms of Kratzer (1991), modals have a “possible worlds” semantics, where words like “must” and “shall” imply compliance in all possible worlds, while words like “may” and “can” imply compliance in at least one possible world.

Deontic modal verbs (where deontic refers to “duty”) express necessity or possibility in the domain of social freedoms to act. In a legal context, they indicate whether an action complies with the written law. Consider the modal verbs can/may: A firm can do X in two senses. *Epistemically*, there exists at least one possible world in which the firm actually does X. *Deontically*, the firm may do X if there is at least one possible world where it does X and it remains compliant with legal or social norms. Similarly, must/will can carry different meanings. Epistemically, a firm must do X if, in all possible worlds, it actually does X. Deontically, a firm must do X if failing to do so would constitute a legal or normative violation. Deontic verbs can also be conditional on specific events. A regulatory rule might state, "If event A occurs, firms can do X" (permissive) or "If event A occurs, firms will do X" (obligatory).

Deontic modal verbs play a crucial role in legal language because they express permissions, obligations, and prohibitions. In doing so, these verbs help translate legal theorist Wesley Hohfeld’s conceptual framework, which classifies legal relations into categories such as "privilege," "right," “disability”, and "duty" (Hohfeld, 1913; Lindahl, 1977; Kramer, 2025). For Hohfeld, if actor A has a *privilege* to do X, then other actors cannot stop A from doing X. A *right* for A means that some action X must be performed for A. Symmetrically, a *duty* means that an actor must perform some action X. In the terminology that we use below, permissions correspond to privileges, rights to rights, and obligations and prohibitions to duties and disabilities. In digital texts, such modal relationships can be extracted at scale using syntactic dependency parsing (e.g. Jurafsky and Martin, 2014).

## 3.2 Processing the Contracts

The contracts database arrived as scanned PDFs. The first step was to convert them to machine-readable text using OCR software. We excluded wage schedules, exhibits, appendices, and other miscellaneous materials. Next, we split the contracts into sections using a custom-built splitter based on the style of contract section headers. Within each section, we used a sentence tokenizer to split each section into a list of sentences.

Each contract sentence is parsed using a syntactic dependency parser called spaCy ([spacy.io](http://spacy.io)). This package uses the ClearNLP dependency schema and has proven accuracy and efficiency relative to other parsers.<sup>14</sup> The parser transforms sentences into parse trees, which represent the relations between words in a recursive hierarchical structure. The verb of a sentence is the root of the parse tree of a sentence, and arrows between words indicate which word depends on which, along with annotations indicating the type of dependency (e.g. subject, object, verb auxiliary, modifier).<sup>15</sup> SpaCy classifies dependencies statistically, and is already trained on a large annotated dataset of parse trees. Appendix Figure A.3 shows the dependency parse for two example sentences.

Like most natural language processing applications, our framework simplifies and abstracts from much of the syntactic and semantic richness of a collective bargaining agreement. Just the length of these contracts is quite informative. Figure 1 shows a tight and proportional relationship between contract length - measured as the log number of clauses of a contract, where each clause is defined as a sentence containing a subject, verb, and object - and firm size, measured as the log number of employees covered by the CBA.<sup>16</sup> That provides some initial descriptive evidence that contract clauses have a public good character.

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<sup>14</sup>See <http://www.mathcs.emory.edu/~choi/doc/clear-dependency-2012.pdf>. SpaCy has been updated to a more recent version since we processed our corpus. Using the more recent version does not substantially change the empirical results.

<sup>15</sup>For a complete list of the types of dependencies, see <https://universaldependencies.org/u/dep/>

<sup>16</sup>A foundational structure in linguistics is that most English sentences take the form “Subject-Verb-Object” (SVO). Subjects are the things or persons taking action or possessing an attribute in the sentence, verbs are the action the subject is taking, and objects are what are being acted on by the verb. Therefore, in our framework each clause has three components: a subject, a verb, and an object.

### 3.3 Clause Types

We build on the “Subject-Verb-Object” structure of each clause to identify types of clauses. First, for the subject, we identified four main personas in the contracts: worker, firm, manager, and union. The subject is assigned using a dictionary of synonyms to one of these four agent categories. Second, for verbs, we are most interested in deontic modal verb structures. The modal verb is distinguished as restrictive (*shall, will, must, should*) or permissive (*may, can*). Statements are tagged as negative (“shall not” rather than “shall”), and tagged as active (“shall hire”) or passive (“shall be hired”). Appendix Table A.2 provides tabulations for the most frequent subjects, modals, and verbs encountered in our data set.

We identify a handful of special verbs that appear often in the contracts and delineate obligations and rights: Obligation Verbs (be required, be expected, be compelled, be obliged, be obligated, have to, ought to), Prohibition Verbs (be prohibited, be forbidden, be banned, be barred, be restricted, be proscribed), Permission Verbs (be allowed, be permitted, be authorized), and Rights Verbs (e.g. receive, gain, earn).<sup>17</sup> We define Action Verbs as all non-special active-tense words, including “be” by itself. Passive Verbs are all non-special passive-tense verbs.

Now, we use these grammatical features to assign statements to one of four types of contract statements (or “other”). The formal requirements, plus some examples, are included in Appendix Table A.3. An *Obligation* requires that the subject perform an action or set of actions (a Hohfeldian *duty*). A *Prohibition* requires that the subject not perform an action or set of actions (also a Hohfeldian *duty*). A *Permission* gives the subject liberty to do an action; others may not stop them from doing so (Hohfeld’s *privilege*). A *Right* gives the subject an entitlement to beneficial actions by others (also called a *right* by Hohfeld).

The grammatical parse approach works well because it precisely identifies the critical structures in the sentence while allowing for flexibility in word order. For example, a dictionary approach for worker rights based on patterns like “employees shall receive” would miss variants like “employees shall always receive.” In Ash et al.

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<sup>17</sup>Receive, gain, and earn are “active” rights verbs in the sense that “worker shall receive” is a right. We also have a long list of “passive” rights verbs, where for example “workers shall be entitled” is considered a right. These passive rights verbs include: entitled, given, offered, reimbursed, paid, granted, provided, compensated, guaranteed, hired, trained, supplied, protected, allowed, covered, informed, notified, selected, awarded. We experimented with a longer list of rights verbs and got similar results.

(2020), we use hand annotation of these phrases to show high precision of these assignments. Appendix Section A.3.3 provides a discussion of the advantages of this method relative to alternatives like dictionary matching, embeddings, and supervised learning.

We extract each statement type for each agent. Appendix Table A.4 shows the most frequent examples for the matrix of agents and statement types. Table 2 reports summary statistics on the overall frequencies. Clauses mostly concern workers (55.3%) and the firm (30.5%), rather than the union (11.7%) or managers (2.5%). In terms of statement types, a majority are obligations (54.4%), followed by rights (26.2%), permissions (14.1%), and prohibitions (5.3%). The three most important agent  $\times$  clause assignments are firm obligations (24.7%), worker rights (22.9%), and worker obligations (20.9%). Notably, there are very few firm rights (0.9%).<sup>18</sup> Overall, then, union contracts mainly do three things: (1) impose obligations on workers, (2) impose obligations on firms, and (3) grant rights to workers.

We focus our downstream empirical analysis primarily on worker rights for the following theoretical and empirical reasons (while also reporting effects on other clause types). Theoretically, worker obligations and firm obligations specify tasks, but they do not specify a clear beneficiary who could make a subsequent legal claim for delivery of the obligation. Worker rights are special because they explicitly guarantee key employment conditions – worker security, autonomy on the job, and the balance of time and pay – while clearly designating *workers* as the *legal beneficiaries* who can pursue claims when those entitlements are not provided (Calabresi and Melamed, 1972). Without committing to providing worker rights as contracted entitlements, management may renege ex post. Hence, workers naturally care about this component of the contract. However, as these protections have costs for the firm, there will be bargaining over the extent of worker rights in a contract. Empirically, we show across three complementary empirical exercises presented in Section 5.2 that worker rights exhibit the strongest and most robust response to labor income taxes, remaining large and significant when controlling for worker obligations and firm obligations and in pooled specifications. This supports the focus on worker rights as the primary

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<sup>18</sup>Appendix Figure A.4 provides a descriptive look into the legal content of these union contracts over time. We plot for each year the average number of rights and obligations per contract, for workers and firms, respectively. We can see that firm obligations, worker rights, and worker obligations increase steadily until 2005. Since then, they are rather constant. The number of firm rights remains small throughout the period.



outcome, as other clause types respond less strongly to taxes.

To get an initial descriptive view of worker rights, we ask how they are distributed across firms, unions, and sectors. Appendix Figure A.7 shows that worker rights are spread relatively widely across firms. Their distribution is slightly more condensed across unions and markedly more condensed across sectors. Among the 30 largest private firms in our sample, the Great Atlantic And Pacific Company Canada (Limited) stands out for offering the most extensive worker rights, while the Canadian Film And Television Production Association (Performers) offers the fewest (Appendix Table A.6). For unions, the Professional Institute of the Public Service of Canada negotiates the most comprehensive worker rights, whereas the Canadian Merchant Service Guild negotiates the fewest (Appendix Table A.7). Across sectors, the wholesale and retail trade sector contains the highest concentration of worker rights clauses, while the construction sector contains the lowest (Appendix Table A.8). As shown in Figure A.6, when fixed effects for year, province, sector, union, and firms are added sequentially to explain variation in worker rights, we see that firm-level differences account for the largest share of explained variation, followed by union-level differences.

### 3.4 Topics Covered by Worker Rights

What do worker rights consist of? Appendix Table A.9 reports a sample of extracted worker-right clauses. These range from provisions governing work hours and overtime, timely payment of wages, holidays and leave, life insurance, and seniority, to procedural rights such as grievance procedures and leave for employees elected to public office. Together, these examples illustrate that worker rights encompass not only traditional fringe benefits but also rules governing workplace organization and employee control.

To summarize this rich set of contractual provisions, we group semantically similar worker-right clauses into topics using sentence embeddings and k-means clustering. Specifically, each clause is represented by a transformer-based sentence embedding (Reimers and Gurevych, 2019), and the resulting embeddings are clustered into 30 worker-right topics. Because the clustering is unsupervised, some individual clauses are misclassified. We therefore interpret the topics as approximate groupings based on their dominant content. Relative to traditional topic models like LDA, this method better captures semantic similarity between clauses while remaining sensitive to con-

text. Details of the embedding model and clustering procedure are provided in Appendix D.

Table 3 summarizes the resulting topics. The first column reports manually assigned narrow topic labels based on representative clauses, while the second aggregates these into seven broader categories (plus the “other” topic; topics ordered by shares, starting with the largest): Scheduling, Vacations, Seniority, Health & Well-Being, Work Termination, Payments, and Family Issues. Together, these topics suggest that collective bargaining devotes substantial attention not only to monetary benefits but also to workers’ control over working time and workplace procedures.

The next columns of Table 3 characterize each topic according to its relationship with monetary compensation. We distinguish between wage-like rights, such as premium pay, paid leave, and insurance benefits, and control rights, such as scheduling, grievance procedures, seniority rules, and personnel records, whose value arises primarily through the allocation of legal authority rather than direct monetary transfers. This distinction plays an important role in the heterogeneity analysis below, where we examine whether taxes affect traditional wage-like benefits differently from broader workplace governance rights. The construction of these measures is described in Appendix D, while Appendix E provides representative clauses underlying each topic.

## 4 Validation of Worker Rights Clauses

The set of clauses that we call worker rights captures benefits, employment conditions, control rights, and procedural safeguards. The clauses are *legal entitlements* to those items, in the sense of Calabresi and Melamed (1972). Even when rights are not actively used, they still hold value. Many function like options: workers can choose to exercise them without requiring further approval from management. Often, however, workers are unaware of the rights available to them until those rights become the subject of a grievance or litigation.

In the text, worker rights clauses are tagged when a worker subject (e.g. “worker”, “employee”) is attached to a verb phrase describing the entitled benefit (see Table A.3). Those verb phrases include a non-negated verb structure with a rights verb (e.g., “employees will receive”, “workers shall be paid”) or a negated modal attached to an obligation verb (e.g. “workers may not be required”, “employees should not be expected”). These phrase templates and rules were developed through application of

legal knowledge to close reading of the clause texts, careful inspection of the associated syntactic parse outputs, and checking of the rule-based category assignments.

This section presents three complementary validation exercises for our procedure and our interpretation of worker rights as benefiting and protecting workers. We first compare worker-rights clauses with other clause types using LLM and human-expert annotations. We then benchmark contract-level worker rights against pro-worker management practices and conclude with a case study of CAW–Chrysler bargaining. In the appendix, we provide additional discussion and comparison of our method to alternatives (Appendix A.3.2 and A.3.3).

## 4.1 Validation with Pairwise Comparisons of Clauses

While the example worker rights clauses discussed above can be fairly interpreted as entitlements that benefit workers, it could be that such an interpretation would also fairly extend to many clauses from the other clause types. It is quite difficult to set an objective threshold for whether a given clause is pro-worker or not. That is a subjective determination that is difficult to calibrate, so human annotations of a sample of contract clauses as pro-worker or not might be of limited value.

A much easier annotation task is to take pairs of clauses and decide which of the two is more favorable to workers. For example, the clause “Employees who retire as well as current retirees and survivors will be provided with Life Insurance in the amount of \$6,000”, versus “If the parties mutually agree, the Company may hire temporary employees for short term periods not longer than 30 work days for non-routine work or special projects”. The second clause (a firm permission) is not clearly favoring or disfavoring workers on its own. But a pairwise comparison is much easier: the second clause is clearly less beneficial to workers than the first clause (a worker right).

A downside of the pairwise comparison approach is that it requires more annotation data. Say we want to get a pro-worker score for 100 clauses for each of the 16 clause types ( $4 \text{ agents} \times 4 \text{ provisions}$ ). That adds up to 1600 annotations. In contrast, with pairwise comparisons we have  $16 \times 15 = 240$  ordered clause-type pairs, or 24,000 annotations to get 100 annotations for each type pair.

That is quite costly in terms of human annotation resources. Fortunately, pairwise comparison in terms of pro-worker clauses is an easy enough task that the newest

generation of human-aligned large language models (LLMs) are “smart enough” to reliably make such comparisons. We validate and implement that approach here.

We compare clause pairs using three open-weights models: Gemma 4 31B (checkpoint google/gemma-4-31B-it, Ollama tag gemma4:31b), GPT-OSS 120B, and Llama 3.1 8B. All receive the system prompt, “You are a helpful legal assistant.” In the first step, the model identifies each clause’s topic and classifies the provision as an obligation, entitlement, permission, or constraint. In the second, it selects which of two clauses is more likely to constitute an entitlement, benefit, or amenity for workers, responding “Definitely 1,” “Probably 1,” “Probably 2,” “Definitely 2,” or “Neither.” This staged prompt provides structured context for the pairwise judgment (Wei et al., 2022). We use Gemma as the primary model and report GPT-OSS and Llama results for robustness.<sup>19</sup>

Appendix Table A.5 benchmarks Gemma against legal experts. Across 160 annotations, Gemma selects the opposite clause in 11.3% of comparisons overall and 9.5% of comparisons involving a worker-rights clause. Among duplicated pairs on which the experts agree, Gemma matches their consensus in 81.0% of cases and selects the opposite clause in 4.8%. Given the sample size, we treat this exercise as an external benchmark rather than a precise validation of the complete category ranking. For more details, see Appendix Section A.3.1.

We then implement this automated annotation procedure for a random sample of 24,000 ordered clause-type pairs of clauses in the labor union contracts corpus. Based on this sample, we compute the predicted probability that each clause type is more pro-worker than all other clause types. Note that the clause-type distribution across the 24,000 pairs of clauses used in this exercise is uniform, as we randomly sample 100 clauses for each of the  $16 \times 15 = 240$  ordered clause-pair types irrespective of actual clause frequency. This design makes the precision of estimated pro-worker frequencies comparable across low- and high-frequency clauses, since it is no longer driven by unequal sample sizes.<sup>20</sup>

The results of that validation are shown in Table 4. According to the LLM pairwise annotations, the clauses that we label as worker rights are substantially more

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<sup>19</sup>We compare our results from Gemma with GPT-OSS and Llama and find a 90.5% agreement rate with GPT-OSS and an 82.7% agreement rate with Llama in cases where at least one clause in a pair is classified as more pro-worker.

<sup>20</sup>We include both orderings of each of the 120 unordered pairs, so that we can average out any position effect in the LLM’s response.

pro-worker than the other categories across different models. Specifically, based on our main result from Gemma, they are more pro-worker 78% of the time, far higher than the second-ranked category of worker permissions (61%). The other common categories have even lower percentages: firm obligations and worker obligations are considered relatively pro-worker 55% and 36% of the time, respectively. Union prohibitions are classified as pro-worker just 14% of the time, making them the least likely to be pro-worker.<sup>21</sup>

## 4.2 Validation Against Survey Data on Pro-Worker Practices

Next, we assess whether our measure of worker rights is related to an external measure of pro-worker management practices. Our data source is the World Management Survey (WMS) (Bloom et al., 2012), which asks firms about a range of human-resource practices. The WMS captures managerial practices and attitudes rather than legally enforceable rights, so we interpret it as a noisy proxy for a firm’s pro-worker orientation rather than a direct benchmark for contract structure.

We are able to link 249 contracts from our CBA dataset (from 42 Canadian manufacturing firms) to the WMS. Compared with the full CBA corpus, the matched contracts are entirely private-sector and somewhat longer but otherwise similar on observed characteristics. The linked firms are also broadly representative of non-linked unionized Canadian manufacturing firms in the WMS across the HR-practice measures.<sup>22</sup> Following Bloom and Van Reenen (2010), we construct a pro-worker HR practices index which increases in the items “managers care about workers”, “promotes good workers”, and “employees are valued”. Items that decrease the index are “focus on top talent”, “incentives”, and “fire poor performers”. We then normalize the summed pro-worker HR index and compare it to our text-based measure of pro-worker rights and other clause types.

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<sup>21</sup>As reported in columns (4) and (5), the results are qualitatively robust across model families and sizes, including smaller open models like Llama. As with the LLMs, worker-rights clauses have the highest pro-worker selection rate in the human-expert annotations.

<sup>22</sup>Appendix Tables A.12 and A.13 report these comparisons. Because the WMS linkage is based on 2010 interviews, we also compare the seven matched CBAs observed in that year with the broader 2010 CBA sample; they differ mainly in private-sector status and firm size. Moreover, the broader WMS sample also provides context for union–non-union differences (Appendix Table A.15). Union firms have a somewhat higher cumulative pro-worker index, although the difference is modest and statistically insignificant; the clearest differences are their weaker reliance on incentive pay, performance-based promotion, and removing weak workers.

Figure 2 plots the association between the pro-worker HR index and each clause type. Worker rights stand out as strongly and significantly positively associated with the index, even after controlling for worker obligations and firm obligations, which themselves are negatively related to the index (Appendix Figure A.9). The worker rights coefficient of 0.02 implies that moving from very low to very high pro-worker HR practices is associated with a 2 percentage point increase in the share of worker rights clauses. Although modest in absolute terms, this association is more than seven times larger than the corresponding association for the absolute value of the average non-worker rights clauses. Overall, these results are consistent with worker rights clauses capturing pro-worker entitlements and autonomy.<sup>23</sup>

In the appendix, we provide additional validation and compare our method with alternative approaches (Appendix A.3.2 and A.3.3). First, we construct a supervised text-predicted excess-employment index from contract topics, motivated by the idea that higher employment conditional on wages reflects higher worker utility. This index is positively correlated with our parser-based worker-rights measure, although it is not correlated with the pro-worker HR practices index. The parser-based measure is positively correlated with both benchmarks, providing additional support that it captures a common worker-rights dimension despite noise in each proxy. Second, we provide a broader methodological discussion comparing the parser-based measure with dictionary methods, human-labeled classifiers, metadata-supervised text scaling, and LLM annotation. These methods provide useful complements, but they are less suited to our setting because legal meaning depends on grammatical relationships, negation, and modality, while supervised methods also require extensive annotations or outcomes that may introduce confounding.

### 4.3 Case Study: Canadian Auto Workers

As a final descriptive validation, we focus on labor contracts between the Canadian Auto Workers (CAW, later Unifor) and DaimlerChrysler (Chrysler). These contracts

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<sup>23</sup>One potential concern with this analysis is selection on HR sophistication, such that our worker-rights measure captures differences in contract-writing capacity. Appendix Table A.14 examines this possibility by sequentially adding firm and contract characteristics as predictors of worker-rights intensity. Even the richest specification has an R-Squared below 0.01, indicating that observable firm and contract characteristics account for little of the variation in worker rights. Although these variables are imperfect proxies for HR and bargaining sophistication, the tax estimates are also robust to firm fixed effects, which absorb persistent differences in firms’ contracting practices; see Column (3) of Appendix Table A.17.

held particular importance under the “pattern bargaining” system of the Canadian auto sector, where Ford, General Motors, and Chrysler typically negotiated similar agreements, with one firm setting the standard. Chrysler is the only automaker that appears in every bargaining round in our data, so we concentrate on the CAW–Chrysler negotiations, even though another firm sometimes set the pattern (for instance, Ford in 2005).

Our analysis centers on the 2005 auto sector crisis—a period when post-WTO imports, a strong Canadian dollar, and rising oil prices exerted intense pressure on domestic manufacturers. Chrysler’s bargaining leverage stemmed from its withdrawal of, and refusal to commit to, new Canadian investments, which left the CAW with limited scope for holding up production. After years of successfully defending and improving contract terms, the CAW was compelled in this round to accept significant concessions, not just in wages but also in highly valued workers’ rights.

Reports at the time speak to the special turning point in these union negotiations. The New York Times reported that the Ford and DaimlerChrysler contracts were “the most modest ever signed by the C.A.W.” (Austen, 2005). CAW President Buzz Hargrove described the negotiations as “totally unprecedented . . . there was ‘no business as usual’ in this round of bargaining” (Canadian Auto Workers, 2005). He wrote, “The companies started bargaining by demanding big concessions: like replacing wage increases with lump sums, abandoning COLA (even for pensioners), 10% co-pays on prescriptions, and giving up a week of paid time off per year” (Canadian Auto Workers, 2005). That is, there were pressures on both wages and rights.

We use this setting to undertake a more targeted validation of our NLP method. We expect that worker rights will decrease in the contract negotiated in 2005. Figure 3 shows a time series of these rights across Chrysler-CAW contracts (red diamonds series). As expected, rights drop precipitously in the 2005 contract. Similarly, contracted wage increases (in blue circles) also decrease in that round. In contrast, other contract features (the average of other clause types besides worker rights, in green triangles) do not change much.

The drop in rights seen in our data is reflected in labor’s contemporaneous response to the cuts. Giving voice to labor activists, Coodin (2005) asks:

Why, given the past breakthrough on outsourcing—which was a catalyst for other Canadian union members fighting job erosion—was such language not further strengthened? Why did the union continue to es-

entially give the companies the green light to push workers harder in the work place. . . Why, when the union had placed work-time on the agenda in every round of bargaining since its formation in 1985, did it set that goal aside?<sup>24</sup>

These discussions show the difficult position that CAW was in during these negotiations.

The divergence between wages and contract language in the 2008 bargain is also consistent with the interpretation of worker rights as a set of entitlements that benefit workers at some cost to the firm. In May 2008, there was a historically high exchange rate between Canadian and U.S. dollars, making Canadian auto wages highly non-competitive with U.S. worker wages. The relative cost of wages to amenities was high for the auto companies, which would manifest as demands for low wage increases and employer concessions on a variety of contractual rights (including no two-tier contracts and keeping a plant open) in response. We observe those trends directly in our time series: a further reduction in contracted wage increases (blue), yet a rebound in rights (red).

Overall, this CAW case study provides additional grounding for our approach. Our parser-based measure of worker rights behaves like a valuable benefit that has to be traded off under significant bargaining pressure. Hence, we can use the prevalence of rights clauses as a well-grounded measure in our subsequent empirical analysis.

## 5 Empirical Analysis

We are interested in measuring how observed contract terms in Canadian collective bargaining agreements respond to changes in local economic conditions, in particular in the income tax rate.<sup>25</sup> We present our empirical approach in Section 5.1, our key results and robustness in Section 5.2, and additional results and further discussion in Section 5.3.

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<sup>24</sup>For a response arguing that the 2005 bargain won gains for unions, see Stanford (2005).

<sup>25</sup>Moreover, we analyze how changes in the local employment rate affect worker rights, see Appendix B. We also assessed the effects of local political control (local government controlled by the New Democratic Party, Canada's labor party), and local sectoral competition (more establishments in a sector in a province, motivated by Aidt and Sena (2005)) on worker rights, without finding conclusive results.



Our approach is similar to the approaches used in the literature on amenities. However, there is an important difference. As Mas (2025) observes, that literature assumes that workers view amenities as consumption commodities that vary in quantity and quality. In contrast, the worker rights that we identify take the form “if this event occurs then one has a right”, such as overtime or a review of an unfair dismissal. An implication is that the value of the union contract can be proxied by the number of contract clauses rather than the quantity of an amenity. This point is detailed in Appendix C, where we also show that there is a trade-off between the average worker’s income tax, and the number of contract clauses in the union contract. This result mirrors a similar result in the amenities literature where there is substitution between after-tax income and the quantity of amenities supplied by the firm.

## 5.1 Empirical Approach

The dataset is built at the level of the contract adopted in province  $p$ , sector  $s$ , firm  $i$ , and effective year  $t$ . For each contract, we have a set of outcomes represented by  $y_{psit}$ , which refer to worker rights and non-worker rights clause types. In the main specification, we look at the share of worker rights – that is, the number of worker rights of a given type divided by the total number of statements in the contract. We chose the share of worker rights as our preferred outcome because it accounts for secular changes in contract length; however, in robustness checks, we report other specifications for the outcome variable including the number of worker rights.

Our main treatment variable is the labor income tax rate that varies at the province by year level. This labor income tax rate, denoted by  $z_{pt}^{tax} = \log(\text{tax})$ , is defined as the (log) province-by-year implicit personal income tax rate computed from income tax revenues as a share of income. In robustness analyses, we use the statutory, marginal, and firm-specific wage table based tax rates as alternative treatment variables. We use a continuous measure for panel regressions, and a discretized version for event study regressions.

We use the following linear model

$$y_{psit} = \rho z_{pt} + \alpha_{ps} + \alpha_{st} + X'_{psit} \beta + \epsilon_{psit}, \quad (1)$$

with the components described as follows. First,  $y_{psit}$  and  $z_{pt}$  are outcomes and explanatory variables of interest, respectively, with  $\rho$  giving the corresponding OLS

coefficients. Second,  $\alpha_{ps}$  refers to province-by-sector fixed effects, and  $\alpha_{st}$  refers to year-by-sector fixed effects (we also present specifications with separate province, sector, and year fixed effects). Third,  $X_{psit}$  may include additional fixed effects (e.g., for union or company), or additional time-varying controls, for use in assessing robustness of  $\hat{\rho}$ . Finally,  $\epsilon_{psit}$  is an error term. Standard errors are clustered by province.

Identification of this specification is threatened by omitted variables that are correlated with both  $z_{pt}$  and  $y_{psit}$ . We first note that because contract renegotiation is generally on a pre-specified timeline, the scope for endogenous timing of contract re-negotiation is limited. Moreover, our fixed effects take care of a wide range of potential confounders including province-by-sector specific differences in the bargaining process, or year-by-sector specific national policies. Nonetheless, our treatments could be correlated with other factors such as political environments that change at the province-by-year level that may also influence union negotiations. In robustness analyses, we present specifications that control for province-level New Democratic Party (NDP) government to account for the possibility that the presence of a left-leaning government might correlate with tax rates and have independent effects on worker rights through other channels such as endogenous law changes. We also explicitly control for a range of pro-union and anti-union labor laws to mitigate concerns about endogenous treatment timing. We also show that there are no effects on the sample composition as indicated by firm entries and firm exits, and no effects on other firm and contract features such as the presence of a COLA clause, firm size and whether the firm operates in the private sector (Appendix Table A.19).

To assess the plausibility of the parallel trends assumption, we also estimate an event study model. We define an event as the largest labor tax increase in each province. Events are limited to the middle years in the sample to ensure a sufficiently large number of pre- and post event years.<sup>26</sup> To account for heterogeneous treatment effects in the presence of staggered treatment timing (Sun and Abraham, 2021), we implement the event study estimator by Callaway and Sant’Anna (2021) using not-yet treated units as controls.<sup>27</sup> We test for parallel trends by looking for evidence of

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<sup>26</sup>Specifically, we define an event as the largest labor tax increase in a given province in the 1990s. For Prince Edward Island, we treat the year of the second largest labor tax increase as the event year, as there was a simultaneous corporate tax reform in the year of the largest labor tax increase.

<sup>27</sup>Two years are grouped together in bins to smooth the number of observations, as there are varying sample sizes in each year. The bins at the beginning (end) of the domain additionally include the years prior to (following) the domain’s starting (ending) year (Schmidheiny and Siegloch, 2023).

pre-trends, and by assessing robustness to plausible violations of the parallel trends assumption (Rambachan and Roth, 2023).

To further account for potential confounders of tax changes, we implement an instrumental variable strategy inspired by Gruber and Saez (2002) and Akcigit et al. (2021). We isolate exogenous changes in the *province* income tax that arise due to changes in *federal* tax rates, driven by associated tax deductions and tax credits. The overall tax rate can be expressed as  $z_{pt} = \log(\tau_{p,t}(\bar{y}_{p,t}) + \tau_{\text{federal},t}(\bar{y}_{p,t}))$ , with  $\tau_{p,t}(\bar{y}_{p,t})$  defining the province level tax rate in province  $p$  and year  $t$  that applies to the average income in that province and year, and  $\tau_{\text{federal},t}(\bar{y}_{p,t})$  defining the federal level tax rate in year  $t$  that applies to the average income in province  $p$  and year  $t$ . Using Kevin Milligan’s Canadian Tax and Credit Simulator (CTaCS) (Milligan, 2021), we calculate our instrumented tax rate for which we lag marginal income and marginal province level tax rates by  $k$  years, with  $k \in \{1, 2, 3\}$ , as follows:

$$z_{pt}^{\text{IV}} = \log(\tau_{p,t-k}(\bar{y}_{p,t-k}) + \tau_{\text{federal},t}(\bar{y}_{p,t-k}))$$

By lagging province level tax rates and income, our instrument does not identify from contemporaneous tax responses to province-level confounders and endogenous income responses to taxes, respectively, but from province tax changes due to changes in *federal* rates.<sup>28</sup>

## 5.2 Effect of Labor Income Taxes on Worker Rights

This section reports how changes in personal income tax rates affect worker rights. Table 5 displays the OLS results from Equation 1, where Columns 1-3 have the share of worker rights as the outcome, and Columns 4-6 have the share of other parsed clauses (e.g. worker obligations, firm obligations, etc.). We respectively control for province, year, and sector fixed effects (col. 1 and 4), province-by-sector and year-by-sector fixed effects (col. 2 and 5), and additionally for Firm/Contract Controls (col. 3 and 6). Throughout all specifications, we find that higher income taxes

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<sup>28</sup>The identifying variation reflects the differential log impact of common federal changes across provinces with different baseline provincial tax levels, and more generally the interaction of federal schedule changes with the province-year income distribution. The exclusion restriction is therefore that, conditional on our fixed effects, national shocks in a given year do not affect worker rights bargaining differentially across provinces through channels correlated with baseline tax levels (such as provincial government size or the strength of automatic stabilizers) other than through the tax rate itself.

increase worker rights clauses, while leaving non-worker rights clauses unaffected. This is consistent with a substitution away from the taxed income (wages) toward untaxed income (rights). The coefficient from col. 2 is our preferred estimate as Firm/Contract Controls may be endogenous. In terms of magnitudes, this preferred coefficient implies that a one percent increase in taxes leads to an increase in the share of contractual worker rights between 0.03 and 0.09 percentage points.

Appendix Table A.17 shows that this result is robust to a range of parametric specifications controlling, among others, for province-specific time trends, firm fixed effects, or a set of variables encoding pro- and anti-union state laws (such as laws banning professional strike-breakers, or mandating secret-ballot certification elections). Results also hold when controlling for the share of parsed clauses and when focusing on the intensive margin only, i.e. when dropping contracts with zero worker rights. Appendix Table A.18 demonstrates that the main result is robust to a range of alternative outcome definitions including the (log) number of worker rights.

To assess the robustness of statistical inference in our setting with a limited number of province clusters of different size, we complement conventional cluster-robust standard errors with alternative inference procedures designed for few and potentially unbalanced clusters. Table A.16 reports p-values based on cluster jackknife estimators and several variants of the wild cluster bootstrap, following Cameron et al. (2011) and MacKinnon et al. (2023b). Across all reported methods, the estimated effect of the tax rate on worker rights remains statistically significant at the 5 percent level, including under restricted wild bootstrap procedures based on jackknife-adjusted score vectors. In addition, Figure A.11 presents cluster influence diagnostics (MacKinnon et al., 2023c), reporting cluster leverage, partial leverage, and omit-one-cluster coefficient estimates for the preferred tax rate coefficient. These diagnostics indicate that the estimated effect is not unduly sensitive to the exclusion of any single province, including the largest province, Ontario.<sup>29</sup> Together, the results indicate that neither the small number of clusters nor heterogeneity in cluster size meaningfully affects statistical inference or coefficient stability.

The main result for worker rights also holds in non-parametric event-study specifications. Figure 4 displays the dynamic Callaway and Sant’Anna (2021) estimator of

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<sup>29</sup>The latter finding is also shown in regression form in Appendix Table A.17, in which we drop Ontario, and more systematically in Appendix Figure A.12, in which we iteratively exclude one province or year.

large, discrete labor tax rate increases. For pre-event periods, we find no substantial trend in worker rights, supporting the identifying assumption of parallel trends. After the tax increase, we observe a significant increase in worker rights. This result remains robust under the sensitivity framework of Rambachan and Roth (2023), which allows for substantial non-linear deviations from parallel trends; see Appendix Figure A.14. Figure 4 reports seven further variants isolating distinct concerns. Within the Callaway and Sant’Anna framework, sector fixed effects and province-sector clustering address differential sectoral trends and clustering robustness; weighting by event size and rescaling the treatment by the magnitude of the tax change replace the binary large-event indicator with its intensity; and controlling for log contract duration addresses the possibility that renegotiation cycles mechanically generate the post-event shape. The last two variants instead use the stacked design of Cengiz et al. (2019), which provides a regression-based framework in which firm fixed effects can be explicitly absorbed. Reporting it both without and with firm fixed effects ensures the comparison isolates the firm effects rather than the change of estimator.<sup>30</sup>

As an additional robustness check, we present results from an instrumental variable approach in which we isolate exogenous changes in the *province* income tax that arise due to changes in *federal* tax rates. First, we analyze the first stage between our baseline tax variable and the instrument based on the log of the sum of marginal federal and lagged marginal provincial tax rates. As shown in Appendix Figure A.16, we find strong first stages with Kleibergen-Paap F-Statistics above 25. Second, we document that the 2SLS estimates of the instrumented tax rates on worker rights clauses paint a similar picture to the corresponding OLS estimates, see Table 6. This implies that our main results are unlikely to be driven by endogenous income responses to taxes or by endogenous tax responses to province-level confounders. The estimates are also robust to controlling for lagged provincial government expenditures (columns 4 and 8 of Table 6), suggesting that differential government size, fiscal capacity, or automatic stabilizers are unlikely to explain our findings.

We further examine the robustness of our results to alternative measures of tax rates. In addition to the implicit personal income tax rate used in the baseline specification, we construct statutory tax rates, marginal tax rates, and firm-specific

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<sup>30</sup>We also examine event studies of tax decreases (not shown). Due to concerns about pretrends, we are cautious not to overinterpret these results (if at all, their effects move in the opposite direction of increases as expected, albeit at smaller magnitudes that suggest downward rigidity in worker rights).

CBA-based tax rates, all using the Canadian Tax and Credit Simulator (CTaCS). Unlike the implicit tax rate, the statutory and marginal tax measures are not mechanically affected by transfer payments and therefore help isolate variation arising from tax policy itself. The statutory tax rate corresponds to the legal labor income tax rate specified in Canadian tax legislation. The marginal tax rate is defined as the incremental tax liability associated with an additional \$100 of income, evaluated at the province-year income distribution. The firm-specific tax measure is based on wage tables for a subset of collective bargaining agreements for which we use GPT-5-mini to identify the relevant pages containing wage tables, extract the wage information, and convert it into average annual wages.<sup>31</sup> Due to limited coverage of wage table extracts (33.7% of all contracts in our sample after dropping outliers), we impute the missing values using province-year-sector wage averages from the LFS. Table A.20 presents the re-estimated OLS specification using the three alternative tax rates as treatment variables (columns 1, 4, and 7) as well as the corresponding 2SLS estimates that instrument these measures with the lagged income counterparts (columns 2, 3, 5, 6, 8, and 9). Across specifications, the estimated effects of these alternative tax measures on worker rights remain positive and statistically significant in most cases, suggesting that the baseline findings are unlikely to be driven by changes in transfer programs or cyclical fluctuations in transfer receipt. The magnitudes are roughly one third to two thirds of the size of the baseline estimates. We therefore interpret the baseline effect sizes with caution, while concluding that the qualitative finding that higher taxes lead to more worker rights remains robust to the choice of tax measure.

Next we present three empirical exercises that explicitly incorporate non-worker rights clauses into the analyses to confirm that focusing on worker rights as the primary outcome is appropriate. First, estimating our main effect of labor income taxes on all legal clause types separately shows that the response is by far largest for worker rights, a pattern that, taken together with the wage estimates, is consistent with worker-right provisions being valued as a non-pecuniary component of compensation (see Appendix Figure A.13).<sup>32</sup> Second, regressions that condition on firm obligations, and additionally on worker obligations, leave the estimated tax effect on worker rights largely unchanged, providing no evidence of substitution across

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<sup>31</sup>Section 2.2 describes the extraction procedure and validates the extracted wages.

<sup>32</sup>Beyond worker rights, we also observe a smaller tax effect on worker obligations. One interpretation of this effect is that some worker rights are granted conditionally, leading to an associated increase in worker obligations.

clause types (see Appendix Table A.17, columns (10)-(11)). Third, analyses of pooled outcomes combining worker rights with firm obligations, and further including worker obligations, yield similarly sizable and significant effects (see Appendix Table A.17, columns (12)-(13)).

Finally, we examine the intensity of worker rights along two dimensions of heterogeneity. First, we test whether the tax effect on worker rights persists in separate analyses that only count worker rights with numbers and worker rights without numbers, respectively. As shown in Appendix Figure A.17 (Panel A), the effect is larger when focusing only on worker rights with numbers but also holds in the sample without numbers, implying the overall effect is driven both by increases in quantitative rights (such as the number of holidays) and qualitative rights (such as the right to work from home). Second, we construct an importance ranking of topics. To do so, we draw a random sample of 10 clauses from each of the 30 topics and form 4,350 between-topic pairs in total, prompting GPT-4.1-mini to assess which clause addresses a more important topic for workers.<sup>33</sup> Aggregating these pairwise comparisons, we compute topic-level odds ratios to rank the importance of topics. Panel B of Appendix Figure A.17 reports point estimates separately for worker rights classified as more versus less important. We find similar magnitudes across these categories. Although the effects are numerically larger for the less important category, the difference between the categories is not statistically significant.

### 5.3 Additional Results and Discussion

**Interpreting the evidence.** Our central empirical finding is that increases in labor income taxes raise the prevalence of worker-rights clauses, consistent with contractual rights functioning as non-wage compensation. Together with the negative relative wage response among unionized workers shown below, this result points to a shift in the composition of negotiated compensation – from taxable wages toward a broader set of contractual rights – rather than necessarily an increase in worker welfare. The

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<sup>33</sup>We use the following two-step prompting procedure: First, we ask “Analyze the following clause from a labor contract. Use step-by-step reasoning to: 1. Identify the main topic: What is this clause primarily about? 2. Type of provision: Is this an obligation, entitlement, permission, or constraint? Clause: \"{clause}\" Provide your analysis in the following format: - Topic: [main topic in 2-5 words] - Provision: [type]”. Based on the resulting topic summary, we then ask “Which of these sentences from a union collective bargaining agreement is on a more important topic for workers? Sentence 1 (Topic: {topic1}):{sentence1} Sentence 2 (Topic: {topic2}):{sentence2} Answer 'Definitely 1', 'Probably 1', 'Probably 2', 'Definitely 2', or 'Neither', do not explain the answer.”

valuation in Table 7 provides a reduced-form, compensation-equivalent scaling of this broader bundle of protections, not a structural willingness-to-pay for a particular amenity. This reallocation is predicted by the model in Appendix C.

In the model, CBAs are characterized as incomplete contracts strategically negotiated between firms and unions. Firms offer combinations of wages and rights under the threat of union strikes. Due to transaction costs involved in writing out contract terms, firms selectively include rights—such as vacation time or seniority rules—in the contract. These rights serve as untaxed compensation, benefiting workers, while imposing costs on firms. Firms contract rights up to the point where their marginal benefit equals marginal cost.

Consequently, the model makes two clear predictions. First, when labor income taxes increase, firms shift compensation towards untaxed rights, resulting in more worker rights clauses. Second, enhanced bargaining power from improved worker outside options similarly incentivizes firms to increase contracted rights. Those predictions align nicely with our empirical evidence.

Another prediction arising from the model is that when taxes go up, strikes should also become more frequent. We test this prediction by estimating Eq. (1) with strike intensity (worker days on strike during contract negotiation) as the outcome variable. Appendix Table A.21 shows that there is a positive and, in most specifications, significant effect of increased income taxes on strike intensity.

**What types of rights do workers value most?** To understand more precisely which worker rights are most valued, we analyze the effects of changes in labor income taxes across specific categories of contract clauses. From the method described in Section 3.4, we have divided up the worker rights clauses into seven broad categories of rights: Family Issues, Health & Well-Being, Payments, Scheduling, Seniority, Vacations, and Work Termination. We run the main regression specification for tax effects, Eq. (1), with the outcome being the clause share of worker rights on that specific topic.

Figure 5 shows the estimates by worker rights category, and we see notable heterogeneity across categories.<sup>34</sup> The largest point estimate is for scheduling. We also find positive, statistically significant effects for health and well-being, payments, and work termination. When ranking worker rights by their substitutability with wages, we find

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<sup>34</sup>For effects on the more granular topics (30 categories), see Appendix Figures A.18 and B.9.



that higher income taxes lead to increases in the least wage-like clauses that are rules and control rights. These effects are insignificantly smaller than those observed for more wage-like benefits, but are also significantly different from zero (see Appendix Figure A.21). The importance of these rights to workers' lives is self-evident, and the literature has produced related evidence for non-union workers (e.g. Mas and Pallais, 2017). However, as unpriced rights like control over scheduling and seniority are not typically captured in standard datasets or included in conventional measures such as health insurance or pensions, their importance is often overlooked. Our findings highlight the need for textual analysis of contracts to uncover the full range of job attributes that matter to workers.

**Are there differences between the public and private sectors?** Public sector CBAs are negotiated in different institutional and bargaining environments compared with private sector CBAs (Gregory and Borland, 1999), which may shape both baseline levels of worker rights and their responsiveness to taxation. Appendix Figure A.19 documents notable distributional differences between public and private contracts: public sector contracts exhibit higher baseline levels of worker rights (with the average share about eight percent larger than in the private sector), complementing long-standing evidence that wages tend to be higher in many settings in the public sector relative to the private sector (Gregory and Borland, 1999). We also document distributional variation across topical groups. For example, public sector workers enjoy relatively more rights related to family issues, while private sector workers have relatively more rights related to vacation. Estimating our main tax specification separately by sector (Appendix Figure A.20), we find that higher labor income taxes lead to significant expansions in worker rights in both the public and private sectors, though point estimates are larger in the public sector. Because governments both set tax rates and bargain with public sector workers, these estimates may be more prone to political economy or reverse causality considerations. Importantly, the same qualitative tax effects persist in the private sector only, where bargaining occurs at the firm level. This result reduces concern that the baseline estimate is driven entirely by public-sector fiscal feedback or governments' dual role as tax setters and employers.

**How valuable are worker rights?** We think of the labor contract as a combination of wages and rights, with workers and firms trading them off based on relative

costs and the relative value to workers (see Appendix C). To quantify this trade-off, we compare the responsiveness of worker rights to labor income taxes with the analogous responsiveness of wages. Holding total surplus constant, the ratio of these effects provides a money-metric scaling of a given change in worker rights. This is a reduced-form measure for the broader bundle of worker-oriented contractual protections, not a structural willingness-to-pay for a particular amenity. The heterogeneity results above clarify this bundle: tax increases affect wage-like and numerical provisions as well as wage-distant control and governance rights.

Our main wage data come from the Canadian Labour Force Survey (LFS). Wages extracted directly from the CBAs using an LLM-based procedure cover only about one-third of contracts but provide a useful validation of the LFS measures.<sup>35</sup> We model the log hourly wage  $w_{psjt}$  for worker  $j$  in province  $p$ , sector  $s$ , at time  $t$  as a function of union status  $u_{psjt}$ , the mean-centered log tax rate  $z_{pt}$ , and their interaction. We regress

$$w_{psjt} = \rho_1 z_{pt} + \rho_2 u_{psjt} + \rho_3 z_{pt} u_{psjt} + \alpha_{ps} + \alpha_{st} + X'_{psjt} \beta + \epsilon_{psjt}, \quad (2)$$

where the other terms are as above, but now at the worker level. The coefficients of interest are  $\rho_1$ , the effect of taxes on wages of non-union workers,  $\rho_2$ , union premium at the sample mean, and  $\rho_3$ , the interaction describing the relative effect of taxes on the wages of union workers.

Table 7 summarizes the main effects of the log tax rate on worker rights (in standard deviations) and log wages. In particular, Column 3 shows the estimates from Eq. (2). We see, first, that higher taxes are associated with higher pre-tax wages, consistent with partial pass-through to firms, and, second, that this wage response is statistically significantly smaller for unionized than for non-unionized workers, as indicated by the negative interaction coefficient.<sup>36</sup> The negative interaction is consistent with unionized firms substituting more strongly between wages and rights than non-unionized firms: the positive effect of taxes on pre-tax wages among non-unionized firms is fully reversed for unionized firms, for which the estimated effect becomes negative. This pattern suggests that unions respond to tax increases by shifting com-

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<sup>35</sup>Section 2.2 describes the extraction procedure and reports the validation statistics.

<sup>36</sup>See Appendix Figure A.22 for the coefficient plot. Appendix Figure A.23 shows that these results are robust to adding survey data from Gallup covering additional years to our main sample from the Canadian Labour Force Survey.

pensation from wages toward untaxed contractual rights. One explanation is that collective bargaining spreads the costs of contract writing across the union membership, allowing unions to negotiate more complete contracts than individual workers could. From a public-finance perspective, the result also implies that estimates of the elasticity of taxable income may be biased when inefficiently bargained contractual rights respond endogenously to taxation (e.g. Chetty, 2009; Chetty et al., 2011).

Our regression estimates for taxes mean that a 10% increase in the income tax rate is associated with the share of worker rights in contracts increasing by about 0.23 standard deviations in our baseline specification (Column 1), and by about 0.16 standard deviations in a specification with firm fixed effects (Column 2). The pooled worker rights specification captures both adjustments within firms and changes in the composition of firms negotiating particular provisions, whereas the firm-fixed-effects specification isolates adjustments within the same firm over time. Meanwhile, a 10% tax increase is associated with union wages falling by 1.3 percent using individual-level wage data from the LFS, and 0.7 percent for our validated province-occupation-year-level LFS market wages. Taken together, these estimates imply that a one-S.D. increase in the share of worker rights is worth between 3% and 8% of wages.<sup>37</sup>

This calculation uses non-unionized workers to identify the counterfactual wage response and assumes comparable valuations of rights across unionized and non-unionized workers. Because workers who value contractual rights more highly may select into unionized jobs, the estimate is best interpreted as applying to the marginal unionized bargaining unit and may represent an upper bound for the broader workforce. It is also not directly comparable to conventional amenity valuations, since the responsiveness of worker rights reflects both firms’ provision costs and bargaining parameters, including the costliness of strikes (Mas, 2025). Nevertheless, its magnitude is broadly consistent with estimates for other workplace attributes. For example, Mas and Pallais (2017) estimate that the option for remote work is worth about 8 percent of wages to workers. The estimates in Lagos (2025) suggest that CBA employment protection is worth 4 percent of wages. Dube et al. (2022) find that a one S.D. increase in “workplace dignity” is worth about 6 percent of wages, while Anelli and Koenig

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<sup>37</sup>The worker rights tax effects remain positive, albeit smaller, under statutory, marginal, and CBA-based tax measures (implying a higher valuation of worker rights), and are qualitatively similar across decades despite the different coverage periods of the CBA and LFS samples (Appendix Table A.22). The estimated tax response of the union wage premium is also consistent with the corporate-tax estimate of Felix and Hines Jr (2022).

(2026) find that reducing workplace fatality risk by 1 in 100,000 is worth 9 percent of wages. Using data from job posts, Roussille and Scuderi (2023) find that a one S.D. increase in amenities is worth about 12 percent of wages. We therefore interpret the 3--8% range as an order-of-magnitude measure of the compensation-equivalent importance of contractual worker rights rather than as a precise welfare estimate.

## 6 Conclusion

This paper applies natural language processing techniques to examine the legal content of labor union contracts. Our findings show that these contracts largely impose obligations on both workers and firms, while granting various rights to workers. Our text-based worker-rights measure aligns with pro-worker human-resource practices in the World Management Survey and with pairwise comparisons by an expert-validated LLM. These aspects of workplace autonomy are challenging to capture using traditional datasets, yet they likely contribute significantly to employee well-being and behave as would be expected if they were non-pecuniary amenities. In our empirical analysis, we find that worker rights differ across firms and shift over time in response to economic conditions. Further, the nature of contractual rights in a collective bargaining agreement, where they are backed by the legal system of courts and arbitration, makes them durable, potentially different from other amenities unilaterally chosen by an employer, which can be rescinded.

Future research could extend the analysis both within and beyond worker-rights clauses. Within worker rights, an important extension is to measure the cardinal generosity of individual provisions, such as the length of leave or the size of an overtime premium. Relatedly, a valuable complement to our analysis would be to survey union leaders and negotiators directly about how they trade off wages against contractual rights as economic circumstances, including tax rates, change. Beyond worker rights, an intriguing observation is the positive association between worker rights and worker obligations. Drawing on Simon (1951), one interpretation is that when giving authority to an agent, one should also add limits to that authority. For example, while firms may provide workers with autonomy over scheduling, such autonomy cannot be without limits. Our parser-based approach allows for a clear separation of worker rights from obligations, and can similarly clarify other dimensions, such as firm obligations. An important open question is whether the observed combinations of clauses repre-

sent efficient bargains or instead impose unnecessary costs on firms. Additionally, our analysis has only briefly touched upon the large number of exemptions, contingencies, and other conditional or qualifying statements within contracts. Future approaches might reveal richer information regarding how real-world contracts incorporate state-contingent terms. More generally, our approach provides a scalable framework for analyzing the legal content of contracts and regulatory texts beyond CBAs, offering new opportunities to study how formal legal language shapes economic and societal outcomes.

Finally, the findings in this paper are potentially important for contract theory. Recent work in contract theory provides good arguments for why simple (e.g. linear) contracts are robustly optimal (Carroll, 2019). But the real-world complexities of contracts, such as collective bargaining agreements, remain beyond the grasp of current theoretical frameworks. As Jean Tirole emphasizes, “While there is no arguing that writing down detailed contracts is very costly, we have no good paradigm in which to apprehend such costs” (Tirole, 1999, p. 773). Oliver Hart, meanwhile, notes that “[a]ctual contracts are poorly worded, ambiguous, and leave out important things” (Hart, 2017, p. 1732). Our granular, comprehensive empirical analysis of the details of CBAs is in line with the observation that real-world contracts are complex, and that this complexity should be explored by economists. While reliably converting the modal semantics of “possible worlds” in legal language into probabilistic statements about state-contingent payoffs is some distance in the future, tools like formal grammar parsing provide scaffolding on which a new generation of structural contract models can be built.

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Table 1: Summary Statistics for Contracts Metadata

| Variable                 | Obs    | Mean    | Std. Dev. | Min   | Max      |
|--------------------------|--------|---------|-----------|-------|----------|
| Private-Sector           | 32,402 | 0.48    | 0.50      | 0     | 1        |
| Number of Employees      | 32,402 | 690.52  | 2886.66   | 0     | 170000   |
| Year                     | 32,402 | 2000.22 | 7.73      | 1986  | 2015     |
| Duration (years)         | 32,402 | 2.60    | 1.17      | 0     | 20       |
| Has COLA                 | 32,402 | 0.28    | 0.45      | 0     | 1        |
| Contract Length          | 32,402 | 535.46  | 382.20    | 10.00 | 12024.00 |
| Annual Wage Increase (%) | 9,150  | 2.57    | 1.81      | -7.56 | 19.84    |
| Union Has Strike         | 32,402 | 0.03    | 0.18      | 0     | 1        |
| Income Tax Rate (%)      | 24,910 | 22.39   | 1.45      | 16.11 | 25.62    |
| Unemployment Rate (%)    | 29,200 | 5.09    | 3.55      | 1.08  | 49.92    |
| Population (1000s)       | 29,471 | 5912.10 | 3753.88   | 96.94 | 11385.56 |
| Employment (1000s)       | 29,471 | 213.51  | 168.87    | 0.20  | 696.73   |

**Note:** Summary Statistics (number of observations, mean, standard deviation, minimum, maximum) of contract characteristics and metadata matched to contracts. Data source: Employment and Social Development Canada, Center for the Study of Living Standards, Canadian Labour Force Survey.

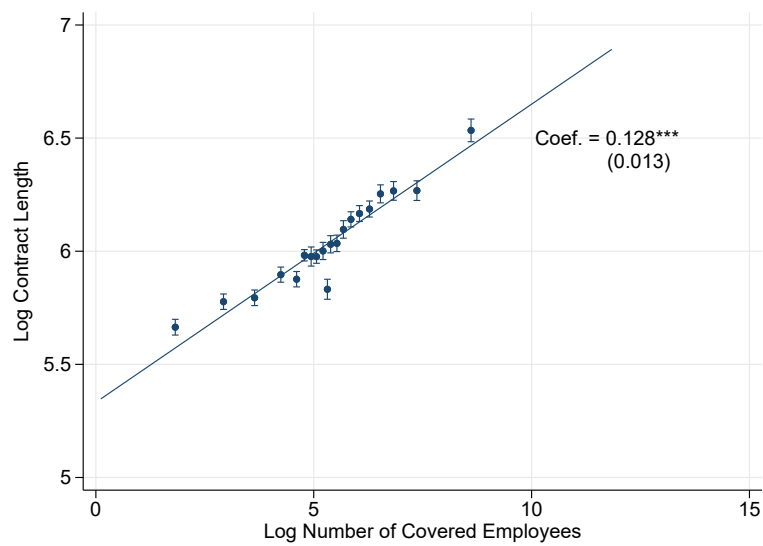
Table 2: Summary Statistics: What do Union Contracts Consist of?

| Agent   | Obligations |             | Rights  |             | Permissions |             | Prohibitions |            | Total     |             |
|---------|-------------|-------------|---------|-------------|-------------|-------------|--------------|------------|-----------|-------------|
|         | Count       | %           | Count   | %           | Count       | %           | Count        | %          | Count     | %           |
| Worker  | 666,021     | 20.9        | 730,327 | 22.9        | 266,278     | 8.4         | 99,795       | 3.1        | 1,762,421 | <b>55.3</b> |
| Firm    | 788,857     | 24.7        | 27,382  | 0.9         | 108,114     | 3.4         | 49,099       | 1.5        | 973,452   | <b>30.5</b> |
| Union   | 224,119     | 7.0         | 68,410  | 2.1         | 62,912      | 2.0         | 17,786       | 0.6        | 373,227   | <b>11.7</b> |
| Manager | 55,518      | 1.7         | 7,512   | 0.2         | 12,537      | 0.4         | 3,107        | 0.1        | 78,674    | <b>2.5</b>  |
| Total   | 1,734,515   | <b>54.4</b> | 833,631 | <b>26.2</b> | 449,841     | <b>14.1</b> | 169,787      | <b>5.3</b> | 3,187,774 | 100.0       |

**Note:** Counts and frequencies (%) of clause types in the contracts corpus, by agent (rows) and statement type (columns). Data source: Employment and Social Development Canada.



Figure 1: Contract Length is Proportional to Firm Size



**Note:** Binscatter plot of the (log) number of clauses in the contract (Y axis) against the (log) number of covered employees (X axis). Data source: Employment and Social Development Canada.

Table 3: Topics Describing Contracted Worker Rights

| Narrow Topic Label             | Broad Topic Label   | Wage Equivalence | Sim to Wages | Frequency | Topic Summary                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------|---------------------|------------------|--------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Personnel Records              | Others              | 1.820            | 0.4550       | 0.024     | The clauses provide workers with the right to access, copy, and be informed about their personal and employment-related documents, including personnel files, job assignments, employment letters, disciplinary documents, and performance reviews.                                                                                                      |
| Grievance & Discipline         | Work Termination    | 1.905            | 0.4111       | 0.031     | The clauses provide workers with rights related to disciplinary actions, grievance procedures, and representation, ensuring transparency, due process, and the ability to challenge or appeal employer decisions.                                                                                                                                        |
| Seniority & Promotion/Transfer | Seniority           | 2.172            | 0.4671       | 0.03      | The clauses are granting workers rights related to job preference, promotion, and transfer based on seniority, qualifications, and experience.                                                                                                                                                                                                           |
| Recall                         | Work Termination    | 2.251            | 0.4373       | 0.032     | The clauses provide rights related to job security and recall for workers who have been laid off, including options to accept vacant positions, refuse temporary recalls without penalty, and priority for rehiring in their former or equivalent positions if they become available.                                                                    |
| Job Security                   | Seniority           | 2.889            | 0.4567       | 0.03      | The clauses provide workers with rights related to job security and stability, including provisions for notification and options in the event of workforce adjustments, opportunities for training or retraining, recall rights for seasonal or displaced employees, and protections for seniority and pay rate in cases of job changes or redundancies. |
| Notice Requirements            | Work Termination    | 2.997            | 0.4399       | 0.027     | The clauses provide workers with rights to receive advance notice regarding absences, layoffs, job vacancies, shutdowns, and meetings, ensuring they have adequate time to prepare for changes in their employment status or work conditions.                                                                                                            |
| Probation Period               | Seniority           | 3.491            | 0.4371       | 0.015     | The clauses provide rights related to the recognition and crediting of probationary periods for employees, including extensions, credit for previous service, and exemptions from additional probationary periods for certain transfers or promotions.                                                                                                   |
| Workplace Safety               | Health & Well-being | 3.573            | 0.6239       | 0.054     | The clauses provide workers with rights related to workplace safety, health protection, and training and union engagement on safety procedures.                                                                                                                                                                                                          |
| Leaves of Absence              | Scheduling          | 4.162            | 0.5159       | 0.039     | The clauses provide workers with the right to take leaves of absence for union activities, public service, education, retraining, and other approved reasons, with varying conditions regarding pay and benefits.                                                                                                                                        |
| Breaks                         | Scheduling          | 4.512            | 0.4523       | 0.013     | The clauses are granting workers the right to paid rest and wash breaks during their work shifts.                                                                                                                                                                                                                                                        |
| Parental Leave                 | Family Issues       | 4.590            | 0.4082       | 0.027     | The clauses provide rights related to maternity and parental leave, including paid and unpaid leave, allowances, and special considerations for employees who are pregnant or adopting a child.                                                                                                                                                          |
| Scheduling                     | Scheduling          | 5.329            | 0.5357       | 0.03      | The clauses provide workers with rights related to scheduling flexibility, compensation for working during non-standard hours or days off, and benefits during absences or layoffs.                                                                                                                                                                      |
| Meals                          | Health & Well-being | 5.763            | 0.4834       | 0.015     | The clauses are granting workers rights related to receiving meal allowances, paid or unpaid meal breaks, and compensation related to meal times during or adjacent to their work shifts.                                                                                                                                                                |
| Part-Time Employment           | Scheduling          | 5.787            | 0.4890       | 0.023     | The clauses are providing rights related to compensation, work hours, seniority, and benefits for part-time employees.                                                                                                                                                                                                                                   |
| Sick Leave                     | Health & Well-being | 5.923            | 0.5090       | 0.025     | The clauses provide workers with rights related to receiving pay or benefits during periods of illness, injury, or medical leave, ensuring financial stability during times they are unable to work due to health reasons.                                                                                                                               |

... continued on next page...

Table 3 (cont.): Topics Describing Contracted Worker Rights

| Narrow Topic Label       | Broad Topic Label   | Wage Equivalence | Sim to Wages | Frequency | Topic Summary                                                                                                                                                                                                                                                                                                         |
|--------------------------|---------------------|------------------|--------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bereavement Leave        | Family Issues       | 6.216            | 0.4002       | 0.028     | The clauses provide workers with bereavement leave, allowing them time off, often with pay, to grieve and attend funerals following the death of a close relative or family member.                                                                                                                                   |
| Workplace Injuries       | Health & Well-being | 6.690            | 0.5412       | 0.024     | The clauses provide workers with rights to compensation and benefits in cases of injury, illness, or accidents occurring in the course of employment, including coverage for lost wages, protection against costs for damaged equipment, and provisions for receiving full or partial pay under specific conditions.  |
| Termination              | Work Termination    | 6.799            | 0.4988       | 0.026     | The clauses are providing workers with rights to various forms of compensation upon termination of employment, including severance pay, payment for unused vacation, and other forms of separation payments.                                                                                                          |
| Vacations                | Vacations           | 6.810            | 0.5398       | 0.045     | The clauses are granting workers rights related to vacation, including the timing, duration, and pay during their vacation periods.                                                                                                                                                                                   |
| Holiday Pay              | Vacations           | 6.812            | 0.5064       | 0.037     | The clauses provide workers with rights to paid holidays, additional compensation for working on holidays, and adjustments to vacation schedules or pay in the event a holiday falls during their vacation period.                                                                                                    |
| Jury Duty                | Others              | 7.356            | 0.3980       | 0.009     | The clauses provide rights to workers for compensation or pay adjustments when they are required to serve on jury duty or appear in court as witnesses, ensuring they are not financially disadvantaged for fulfilling these civic duties.                                                                            |
| Seniority-Based Vacation | Vacations           | 7.374            | 0.4908       | 0.038     | The clauses are granting workers vacation benefits and time off based on their length of service and seniority.                                                                                                                                                                                                       |
| Reimbursements           | Payments            | 7.417            | 0.5326       | 0.022     | The clauses provide workers with rights to compensation and allowances for time spent and expenses incurred due to work-related travel, delays, and use of personal vehicles for work purposes.                                                                                                                       |
| Seniority-Based Benefits | Seniority           | 7.436            | 0.5973       | 0.039     | The clauses provide workers with rights related to pro-rated benefits, eligibility for allowances based on employment duration, credit for service and seniority during leaves, cost-sharing for benefits, and entitlements based on continuous service, including adjustments in pay and long-term disability plans. |
| Overtime                 | Scheduling          | 7.714            | 0.5014       | 0.026     | The clauses provide workers with rights to receive enhanced compensation and specific benefits for working overtime, including higher pay rates for overtime hours, compensation for cancelled overtime, meal reimbursements, and shift change notifications.                                                         |
| Position Classification  | Seniority           | 7.723            | 0.5134       | 0.036     | The clauses are providing workers with rights to receive pay adjustments or increases when they take on duties in higher paying classifications, substitute in higher paying roles, transfer to new positions with higher salary scales, or are temporarily appointed to positions of a higher pay grade.             |
| Work Hours               | Scheduling          | 7.798            | 0.4866       | 0.058     | The clauses provide workers with rights to guaranteed minimum pay for short-notice work, overtime compensation, pay for additional duties or hours beyond their regular schedule, and specific pay rates for work under certain conditions or times.                                                                  |
| Payment Rules            | Payments            | 8.367            | 0.5911       | 0.051     | The clauses are giving workers rights related to the timing, frequency, and accuracy of their wage payments.                                                                                                                                                                                                          |
| Holiday Work Pay         | Vacations           | 8.563            | 0.5143       | 0.026     | The clauses provide workers with enhanced compensation for working on holidays, weekends, or their scheduled days off, including provisions for part-time and temporary employees.                                                                                                                                    |
| Shift Premiums           | Payments            | 9.220            | 0.5088       | 0.025     | The clauses are providing workers with additional compensation for working under specific conditions, such as shift differentials, premium pay for weekends or consecutive shifts, and pay increases for assuming additional responsibilities or working in particular locations.                                     |

**Note:** List of topics describing worker rights clauses. “Narrow Topic Label” is a human-provided label based on the contained clauses and summary. “Broad Topic Label” is a human-provided label for the topical groups based on the contained clauses and summary. “Wage Equivalence” is the sorting variable and scores the topics by their substitutability with wages (see details in text). “Sim to Wages” scores the topics by their similarity to wages (see details in text). “Frequency” is the topic’s share of all worker-right clauses. The displayed shares do not sum to one because the table omits two teacher-specific topics. “Topic Summary” is an LLM-generated summary of the topic based on a sample of associated clauses.

Table 4: LLM Validation of Worker Rights as Favoring Workers

| Clause Type         | Clause Frequency (%) | Pro-Worker Frequency (%)<br>(Gemma) | Pro-Worker Frequency (%)<br>(GPT-OSS) | Pro-Worker Frequency (%)<br>(Llama) |
|---------------------|----------------------|-------------------------------------|---------------------------------------|-------------------------------------|
| <b>Worker Right</b> | <b>22.9</b>          | <b>78.1</b>                         | <b>80.7</b>                           | <b>80.0</b>                         |
| Worker Permission   | 8.4                  | 60.8                                | 64.3                                  | 64.8                                |
| Union Right         | 2.1                  | 59.3                                | 63.2                                  | 70.5                                |
| Manager Right       | 0.2                  | 57.1                                | 53.9                                  | 56.4                                |
| Firm Obligation     | 24.7                 | 54.8                                | 56.9                                  | 60.2                                |
| Manager Prohibition | 0.1                  | 41.1                                | 40.7                                  | 36.6                                |
| Union Permission    | 2.0                  | 37.8                                | 48.5                                  | 37.8                                |
| Worker Obligation   | 20.9                 | 35.6                                | 36.2                                  | 55.2                                |
| Firm Prohibition    | 1.5                  | 30.4                                | 33.4                                  | 36.2                                |
| Manager Obligation  | 1.7                  | 29.8                                | 43.6                                  | 43.5                                |
| Worker Prohibition  | 3.1                  | 27.7                                | 28.6                                  | 48.0                                |
| Firm Permission     | 3.4                  | 19.2                                | 19.7                                  | 28.9                                |
| Manager Permission  | 0.4                  | 18.0                                | 20.8                                  | 27.8                                |
| Firm Right          | 0.9                  | 15.6                                | 18.3                                  | 38.2                                |
| Union Obligation    | 7.0                  | 14.2                                | 21.7                                  | 36.3                                |
| Union Prohibition   | 0.6                  | 13.8                                | 15.7                                  | 28.3                                |

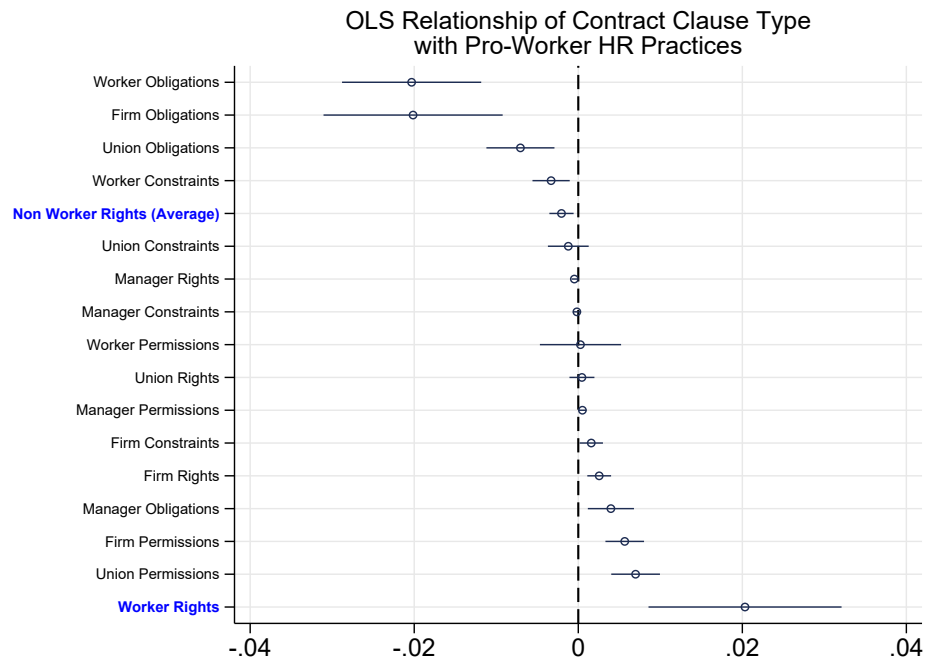
**Note:** Statistics from pairwise comparisons of clause types with LLMs, as described in the text. Rows indicate clause types. Second column gives the frequency of that clause in the corpus; columns 3-5 give the proportion of pairwise comparisons where that category's clause is annotated as more beneficial to workers than the paired clause from another category across different models. Sorted by third column. Data source: Employment and Social Development Canada.

Table 5: Labor Income Tax Rate and (Non-)Worker Rights Clauses

|                                           | <u>Worker Rights<br/>Clauses</u> |                     |                     | <u>Non-Worker Rights<br/>Clauses (Average)</u> |                  |                  |
|-------------------------------------------|----------------------------------|---------------------|---------------------|------------------------------------------------|------------------|------------------|
|                                           | (1)                              | (2)                 | (3)                 | (4)                                            | (5)              | (6)              |
| Log Income Tax Rate                       | 0.055***<br>(0.016)              | 0.061***<br>(0.015) | 0.056***<br>(0.016) | 0.001<br>(0.002)                               | 0.003<br>(0.002) | 0.002<br>(0.002) |
| R-Squared                                 | 0.10                             | 0.15                | 0.17                | 0.13                                           | 0.20             | 0.23             |
| Number of Observations                    | 24,857                           | 24,826              | 23,465              | 24,857                                         | 24,826           | 23,465           |
| Province, Year, and Sector FEs            | X                                |                     |                     | X                                              |                  |                  |
| Province-by-Sector and Year-by-Sector FEs |                                  | X                   |                     |                                                | X                |                  |
| Firm/Contract Controls                    |                                  |                     | X                   |                                                |                  | X                |

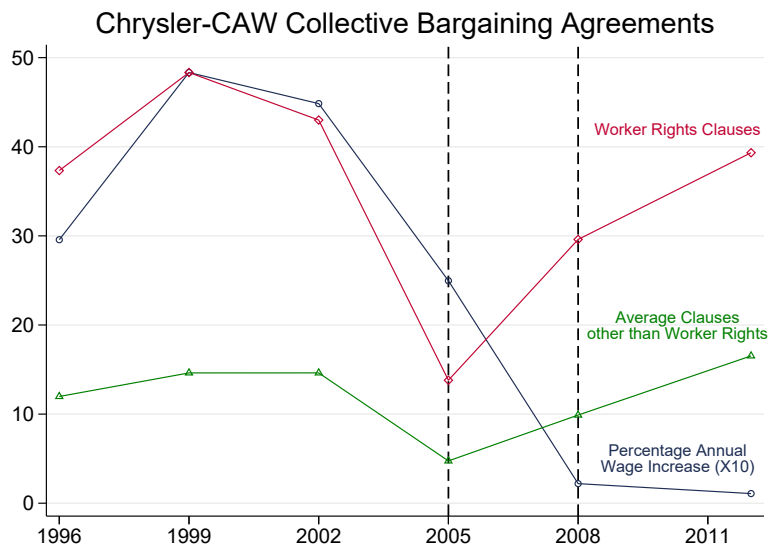
**Note:** Coefficients and standard errors of effect of labor tax rate on worker rights clauses (Columns 1-3) or other parsed provisions (Columns 4-6), for different specifications as indicated in table footer. Outcome for Columns 1-3: Share of worker rights clauses, defined as number of worker rights clauses over the number of all clauses. Outcome for Columns 4-6: Averaged share of other parsed clauses besides worker rights (e.g. firm obligations, worker obligations, etc) over the total number of all clauses. Treatment: Labor tax rate is defined as logarithmized implicit personal income tax rate. Inference: Standard errors clustered at the province level. Firm/Contract controls: firm size (log of number of employees), contract duration (log), contract length (log), COLA clause (indicator), and private firm (indicator). Single, double, and triple asterisks indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards.

Figure 2: Clause Types and Pro-Worker HR Practices



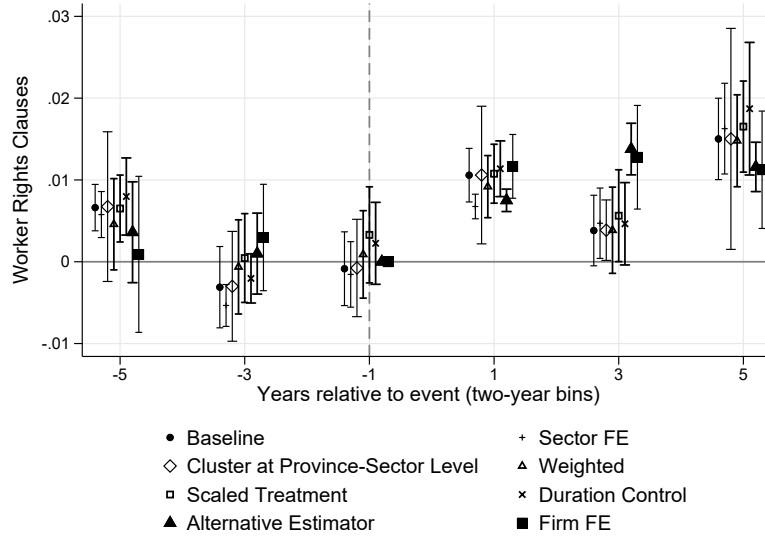
**Note:** Figure presents coefficients and 95% confidence intervals of regression of contract clause types on index for Pro-Worker HR Practices. Each coefficient is from a separate OLS regression. Outcome: Clause type share (number of clauses of type in question over the number of all clauses). Treatment: Index of Pro-Worker HR Practices, normalized to range between 0 and 1, and defined as sum of approval rates to six statements about worker practices; it increases in “managers care about workers”, “promotes good workers”, and “employees are valued,” and decreases in “focus on top talent”, “incentives”, and “fire poor performers”. Controls: None. Inference: Heteroscedasticity-robust standard errors. Data sources: Employment and Social Development Canada, World Management Survey (Bloom et al., 2012).

Figure 3: Case Study: Pay and Rights During the 2005 Auto Sector Crisis



**Note:** Time series of features of the Chrysler-CAW contract, 1996 to 2012. The series includes counts of parsed worker rights (red), average of other clauses besides worker rights (green), and contracted wage increases (blue). The dashed vertical line in 2005 indicates the year of the auto sector crisis, the dashed vertical line in 2008 indicates the year of the financial crisis.

Figure 4: Event Study: Income Tax Increases and Worker Rights



**Note:** Figure presents coefficients for time indicators before and after labor tax rate increase on share of worker rights clauses. Callaway and Sant’Anna (2021) estimator in the implementation of Rios-Avila et al. (2022), accounting for heterogeneous treatment effects and staggered treatment timing. Dynamic aggregation/event study effects, using doubly robust inverse probability weighting. Outcome: Share of worker rights (number of worker rights over the number of all clauses). Controls: Not-yet-treated observations. Event is defined as the largest labor tax increase in a given province in the 1990s, where labor tax rate is defined as logarithmized implicit personal income tax rate. Numbers on horizontal axis refer to years relative to event, binned to two years; i.e., -1 = two years prior to event. Inference: Standard errors clustered at the province level unless noted otherwise; 90 percent confidence intervals displayed. First estimator is baseline Callaway and Sant’Anna (2021) as described so far, second estimator is Callaway and Sant’Anna (2021) that adds sector fixed effects as control variables, third estimator is Callaway and Sant’Anna (2021) that clusters standard errors at the province-sector level, fourth estimator is Callaway and Sant’Anna (2021) that weights estimates by the event size (magnitude of the largest labor tax increase in a given province in the 1990s), fifth estimator is Callaway and Sant’Anna (2021) that scales treatment by the event size (magnitude of the largest labor tax increase in a given province in the 1990s), sixth estimator is Callaway and Sant’Anna (2021) that adds logarithm of contract duration as control variable, seventh estimator implements the alternative TWFE estimator by Cengiz et al. (2019), eighth estimator is Cengiz et al. (2019) that adds firm fixed effects. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards.

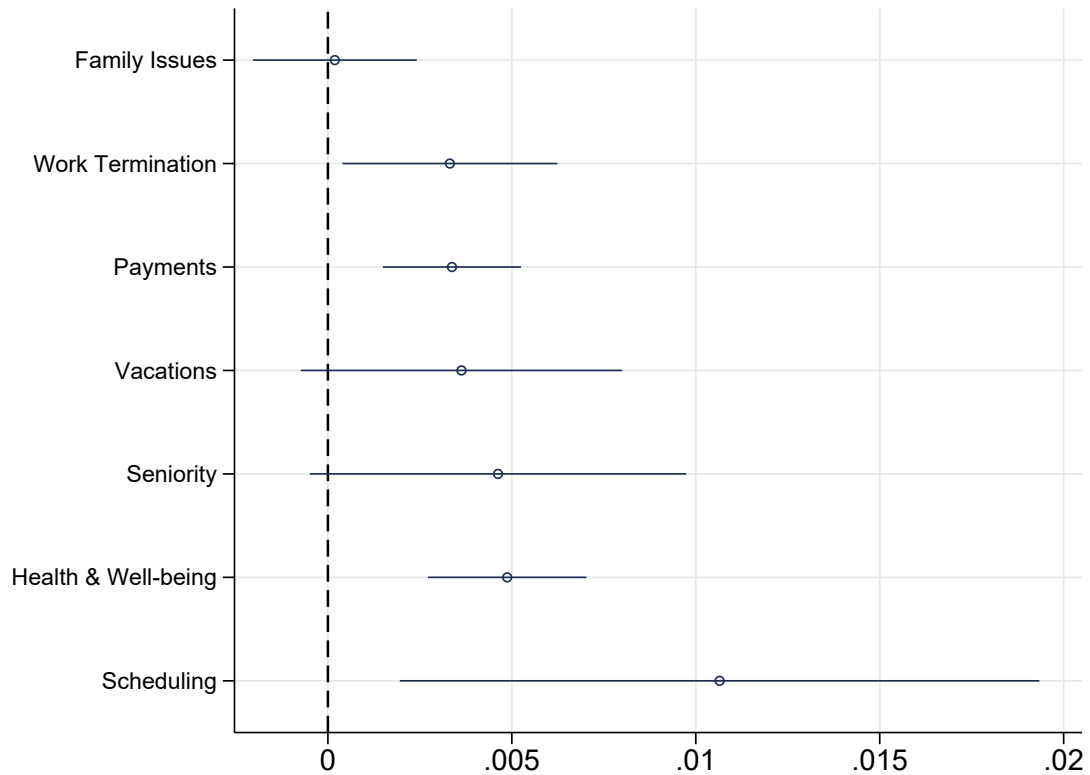
Table 6: Effect of Instrumented Labor Tax on Worker Rights

|                                              | Lag = 3 years                     |                                     |                          |                          | Average of Lags 1, 2, 3 years     |                                     |                          |                          |
|----------------------------------------------|-----------------------------------|-------------------------------------|--------------------------|--------------------------|-----------------------------------|-------------------------------------|--------------------------|--------------------------|
|                                              | First<br>Stage<br>Log<br>Tax Rate | Reduced<br>Form<br>Worker<br>Rights | 2SLS<br>Worker<br>Rights | 2SLS<br>Worker<br>Rights | First<br>Stage<br>Log<br>Tax Rate | Reduced<br>Form<br>Worker<br>Rights | 2SLS<br>Worker<br>Rights | 2SLS<br>Worker<br>Rights |
| Outcome:                                     | (1)                               | (2)                                 | (3)                      | (4)                      | (5)                               | (6)                                 | (7)                      | (8)                      |
| Lagged Log Tax Rate                          | 0.194***<br>(0.034)               | 0.014*<br>(0.006)                   |                          |                          | 0.215***<br>(0.043)               | 0.012*<br>(0.005)                   |                          |                          |
| Instrumented Log Tax Rate                    |                                   |                                     | 0.071**<br>(0.023)       | 0.068**<br>(0.024)       |                                   |                                     | 0.054**<br>(0.021)       | 0.049*<br>(0.022)        |
| Kleibergen-Paap rk Wald F-Statistic          |                                   |                                     | 32.48                    | 26.48                    |                                   |                                     | 25.28                    | 22.63                    |
| R-Squared                                    | 0.92                              | 0.15                                | 0.003                    | 0.003                    | 0.92                              | 0.15                                | 0.003                    | 0.003                    |
| Number of Observations                       | 24,826                            | 24,826                              | 24,826                   | 24,826                   | 24,826                            | 24,826                              | 24,826                   | 24,826                   |
| Province-by-Sector and<br>Year-by-Sector FEs | X                                 | X                                   | X                        | X                        | X                                 | X                                   | X                        | X                        |
| Lagged government Expenditure                |                                   |                                     |                          | X                        |                                   |                                     |                          | X                        |

**Note:** Table presents the first stage, reduced form, and 2SLS coefficients of estimation of instrumented labor tax rate on worker rights. Outcome for Columns 1 and 5: Labor tax rate, defined as logarithmized implicit personal income tax rate. Outcome for Columns 2,3,4, 6, 7, and 8: Share of worker rights (number of worker rights over the number of all clauses). Treatment for Columns 1,2,5 and 6: Lagged Log Labor tax rate in province p and year t, defined as the log of the sum of marginal federal income tax rate of year t, calculated for an additional \$100 of federal income of province p and year t-k, and the marginal province income tax rate of province p and year t-k, calculated for an additional \$100 income of province p and year t-k, for k=1, 2, 3. Treatment for Columns 3, 4, 7 and 8: Log Labor tax rate in province p and year t, instrumented by the log of the sum of marginal federal income tax rate of year t, calculated for an additional \$100 of federal income of province p and year t-k, and the marginal province income tax rate of province p and year t-k, calculated for an additional \$100 income of province p and year t-k, for k=1, 2, 3. Controls: Province-by-sector fixed effects and year-by-sector fixed effects. Lagged government expenditure is the one year lag of provincial government total expenditure excluding debt service. Inference: Standard errors clustered at the province level. Single, double, and triple asterisks indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards, Statistics Canada.



Figure 5: Effect of Tax Rate on Worker Rights Clauses, by Category



**Note:** This figure presents coefficients and 95% confidence intervals of the effect of the labor income tax rate on worker rights separately by category, with the categories built using clustered sentence embeddings as described in Section 3.4. Each coefficient is from a separate OLS regression. Outcome: Share of worker rights clauses that belong to given topic group (number of worker rights clauses of topic group in question over the number of all clauses). Treatment: Labor tax rate, defined as log implicit personal income tax rate. Controls: Province-by-sector fixed effects and year-by-sector fixed effects. Inference: Standard errors clustered at the province level. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards, Canadian Labour Force Survey.

Table 7: Valuing Worker Rights in Terms of Wages

|                                              | (1)<br>Worker Rights (S.D.) | (2)<br>Worker Rights (S.D.) | (3)<br>Log Wages    | (4)<br>Log Market Wages |
|----------------------------------------------|-----------------------------|-----------------------------|---------------------|-------------------------|
| Log Tax Rate                                 | 2.34***<br>(0.59)           | 1.58***<br>(0.54)           | 0.23*<br>(0.10)     | 0.21**<br>(0.09)        |
| Union                                        |                             |                             | 0.21***<br>(0.01)   | -0.008<br>(0.01)        |
| Log Tax Rate * Union                         |                             |                             | -0.36**<br>(0.15)   | -0.28***<br>(0.08)      |
| R-Squared                                    | 0.15                        | 0.55                        | 0.31                | 0.39                    |
| Number of Obs                                | 24,826                      | 22,554                      | 4,877,128           | 4,877,128               |
| Province-by-Sector<br>and Year-by-Sector FEs | X                           | X                           | X                   | X                       |
| Firm FEs                                     |                             | X                           |                     |                         |
| Dataset:                                     | Union Contracts             | Union Contracts             | Labour Force Survey | Labour Force Survey     |

**Note:** Coefficients and standard errors of effect of labor tax rate on share of worker rights clauses in the contracts (Columns 1 and 2), on log wages in the LFS (Column 3), and on log market wages based on LFS wage data of both unionized and non-unionized workers' log annual wages (before taxes and other deductions, but including tips, commission and bonuses) aggregated to the province-occupation-year level (Column 4), where Columns 3 and 4 also include dummies for union and the interaction of log tax rate and union. Labor tax rate is defined as mean-centered logarithmized implicit personal income tax rate. Inference: Standard errors clustered at the province level. Single, double, and triple asterisks indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards, Canadian Labour Force Survey.

# A Empirical Appendix

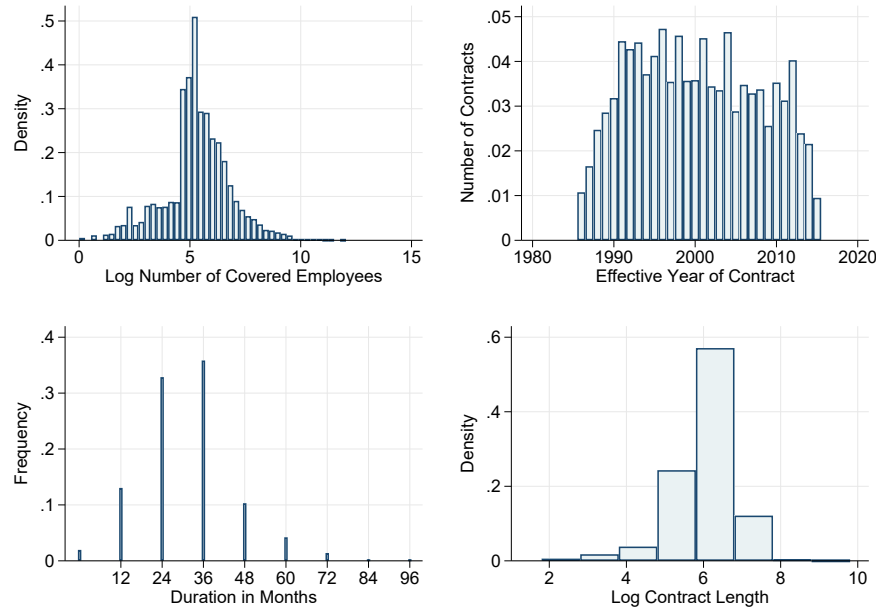
## A.1 Appendix Material: Data Sources

Table A.1: Summary Tabulations for Contracts Metadata

| Province                | Freq.  | Percent | Sector                | Freq.  | Percent |
|-------------------------|--------|---------|-----------------------|--------|---------|
| Alberta                 | 3,820  | 11.79   | Construction          | 1,626  | 5.02    |
| British Columbia        | 4,085  | 12.61   | Educational / Health  | 11,461 | 35.37   |
| Manitoba                | 1,639  | 5.06    | Entertainment         | 945    | 2.92    |
| Multiprovince           | 2,005  | 6.19    | Finance / Real Estate | 886    | 2.73    |
| New Brunswick           | 740    | 2.28    | Information / Culture | 1,295  | 4.00    |
| Newfoundland / Labrador | 539    | 1.66    | Manufacturing         | 5,485  | 16.93   |
| Northwest Territories   | 438    | 1.35    | Primary industries    | 465    | 1.44    |
| Nova Scotia             | 1,169  | 3.61    | Public admin          | 3,882  | 11.98   |
| Nunavut                 | 171    | 0.53    | Transportation        | 4,893  | 15.10   |
| Ontario                 | 15,719 | 48.51   | Utilities             | 560    | 1.73    |
| Prince Edward Island    | 146    | 0.45    | Wholesale / Retail    | 904    | 2.79    |
| Quebec                  | 558    | 1.72    | Total                 | 32,402 | 100     |
| Saskatchewan            | 1,177  | 3.63    |                       |        |         |
| Yukon Territory         | 196    | 0.60    |                       |        |         |
| Total                   | 32,402 | 100     |                       |        |         |

**Note:** Absolute and relative frequencies of contracts, by province/territory and sector. Data source: Employment and Social Development Canada.

Figure A.1: Summary Figures for Contracts Metadata



**Note:** Histograms of selected metadata of contracts: (i) Log number of employees covered by given contract; (ii) Effective year of contract; (iii) Duration of a given contract in months, (iv) Log contract length. Data source: Employment and Social Development Canada.

Figure A.2: Income Tax Rate Over Time

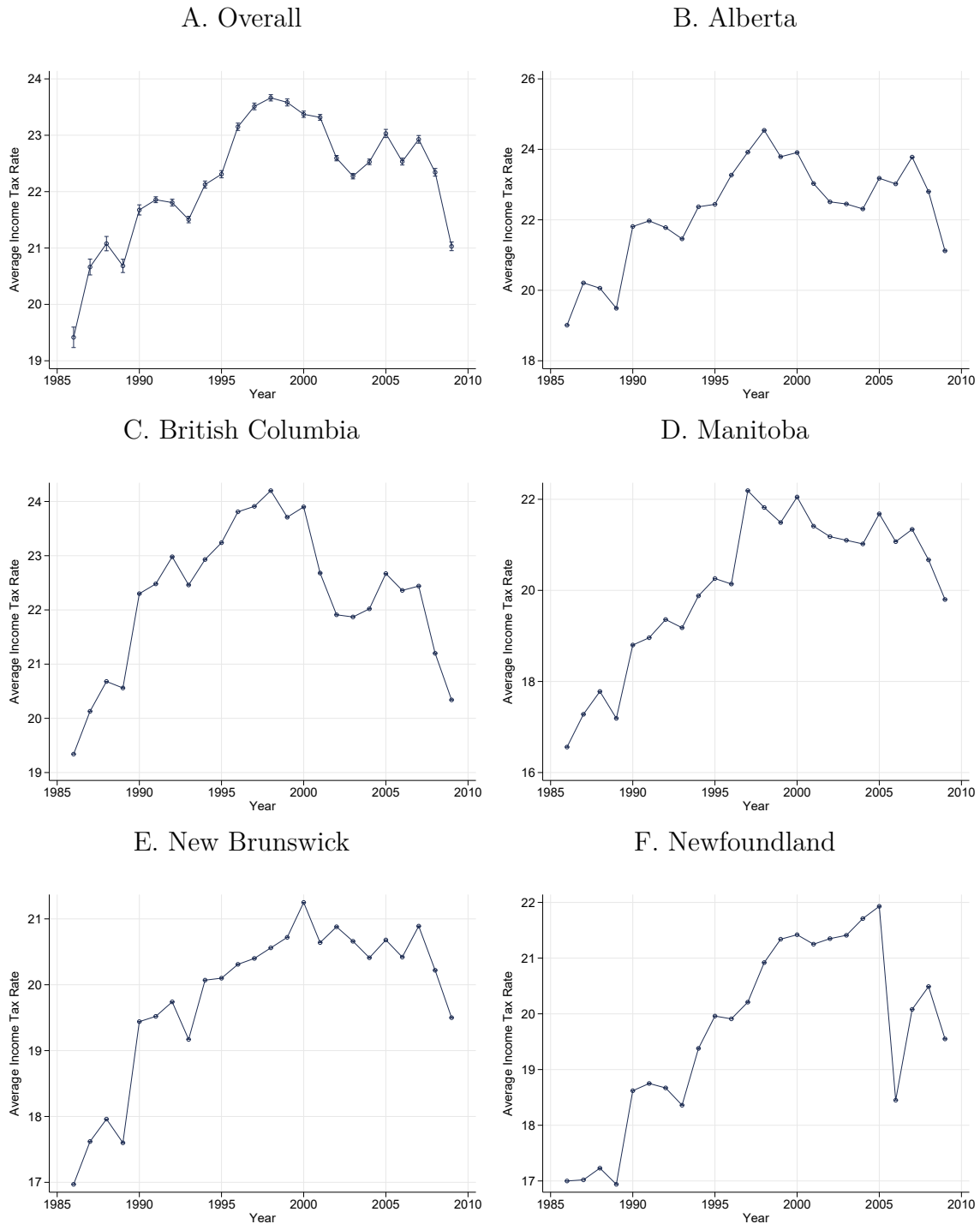
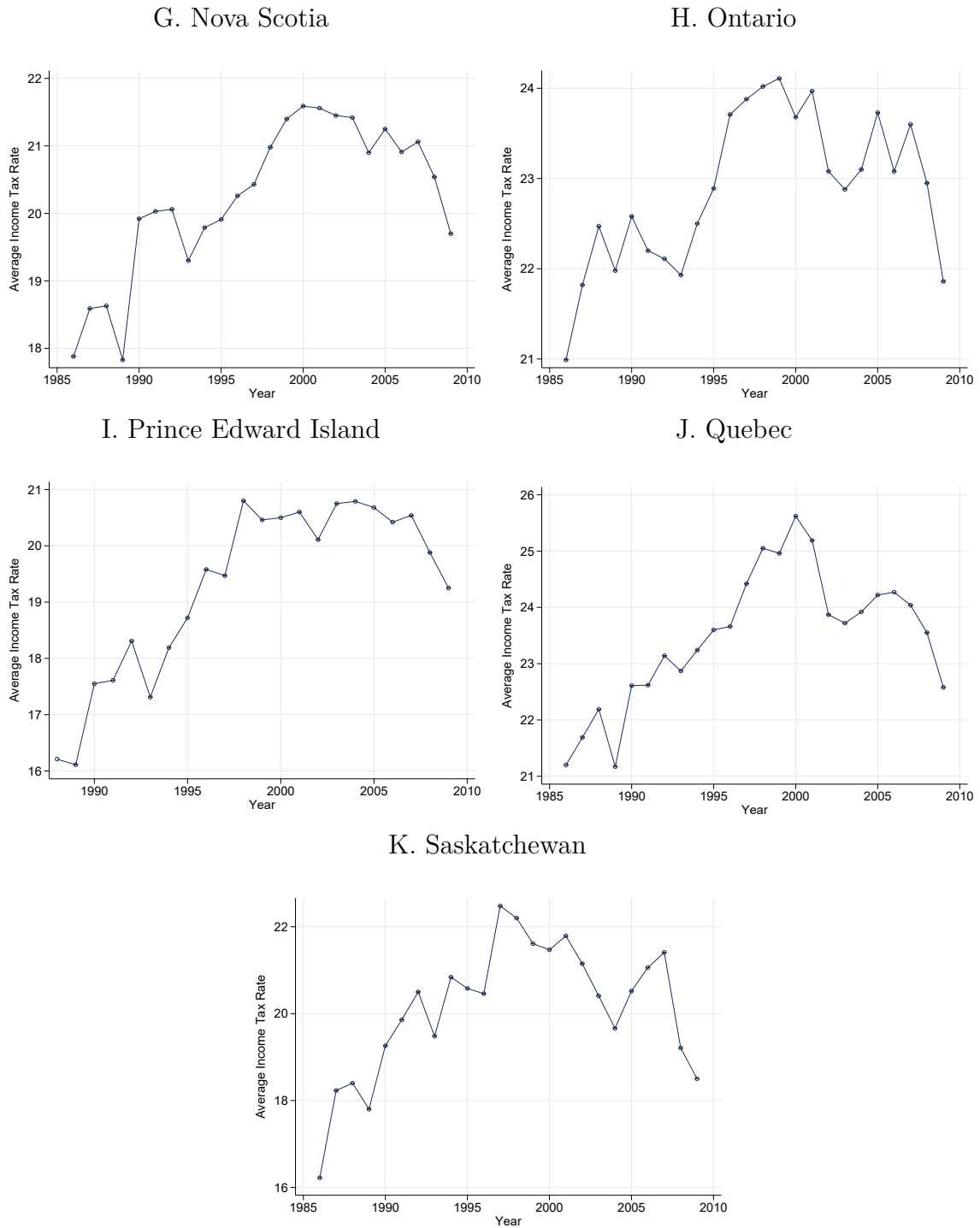


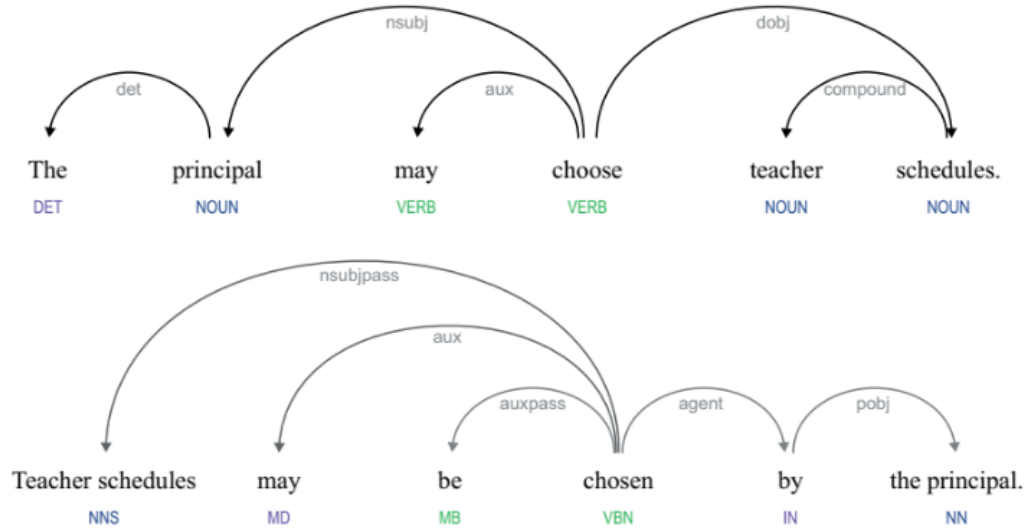
Figure A.2 (cont.): Income Tax Rate Over Time



**Note:** Average labor income tax rate with 95% CI over time. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards.

## A.2 Appendix Material: Contract Parsing

Figure A.3: Syntactic Dependency Parse for Deontic Modal Verb Structures



**Note:** Two examples of a parse tree. Each parse tree represents the relations between words in a recursive hierarchical structure. The edge labels indicate the relation between two words in a sentence.

---

Table A.2: Summary Tabulations: Subjects, Modals, and Verbs

| Subject   | Freq. |        | Verb          | Freq. |
|-----------|-------|--------|---------------|-------|
| employee  | 32465 |        | be            | 35265 |
| who       | 12633 |        | have          | 6212  |
| it        | 7198  |        | agree         | 5900  |
| employer  | 6431  |        | be_pay        | 5400  |
| company   | 5666  |        | receive       | 4236  |
| which     | 5404  |        | work          | 4035  |
| he        | 5101  |        | be_require    | 3656  |
| party     | 4044  |        | apply         | 3468  |
| they      | 3997  |        | provide       | 3045  |
| there     | 3081  |        | be_make       | 2955  |
| union     | 2735  |        | be_entitle    | 2694  |
| that      | 2649  | Modal  | be_grant      | 2663  |
| teacher   | 2598  | shall  | continue      | 2355  |
| member    | 2501  | will   | be_give       | 2301  |
| leave     | 2303  | may    | pay           | 2237  |
| board     | 2247  | must   | be_consider   | 1945  |
| grievance | 2092  | should | include       | 1639  |
| dans      | 1960  | would  | make          | 1570  |
| nurse     | 1809  | can    | become        | 1553  |
| hour      | 1690  | could  | mean          | 1518  |
| hospital  | 1626  | might  | be_provide    | 1495  |
| rate      | 1612  | ought  | occur         | 1486  |
| time      | 1596  | need   | complete      | 1420  |
| period    | 1572  |        | be_understand | 1402  |
| he/she    | 1485  |        | leave         | 1301  |
| she       | 1460  |        | require       | 1293  |
| committee | 1350  |        | take          | 1224  |
| day       | 1346  |        | be_agree      | 1212  |
| work      | 1301  |        | recognize     | 1202  |
| agreement | 1299  |        | be_deem       | 1188  |
| provision | 1278  |        | meet          | 1142  |
| seniority | 1267  |        | give          | 1102  |
| notice    | 1233  |        | notify        | 1092  |
| position  | 1224  |        | commence      | 1063  |

**Note:** List of most common subjects, modal verbs, and verbs in the extracted contract clauses, ordered by absolute frequency, respectively. Data source: Employment and Social Development Canada.

Table A.3: Contract Clause Typology

| Categorization Logic                      | Examples                                                   |
|-------------------------------------------|------------------------------------------------------------|
| <b>Obligations</b>                        |                                                            |
| Positive & Strict Modal & Active Verb     | shall provide, shall include, shall notify, shall continue |
| Positive & Strict Modal & Obligation Verb | shall be required, shall be expected, shall be obliged     |
| Positive & Non-Modal & Obligation Verb    | is required, is expected                                   |
| <b>Prohibitions</b>                       |                                                            |
| Negative & Any Modal & Active Verb        | shall not exceed, shall not use, shall not discriminate    |
| Negative & Permission Verb                | shall not be allowed, is not permitted                     |
| Positive & Strict Modal & Constraint Verb | shall be prohibited, shall be restricted                   |
| <b>Permissions</b>                        |                                                            |
| Positive & Non-Modal & Permission Verb    | is allowed, is permitted, is authorized                    |
| Positive & Permissive Modal & Active Verb | may be, may request, may use, may require, may apply       |
| Negative & Any Modal & Constraint Verb    | shall not be restricted, shall not be prohibited           |
| <b>Rights</b>                             |                                                            |
| Positive & Active Rights Verb             | shall receive, shall earn                                  |
| Positive & Passive Rights Verb            | shall be paid, shall be allowed                            |
| Negative & Any Modal & Obligation Verb    | may not be required                                        |

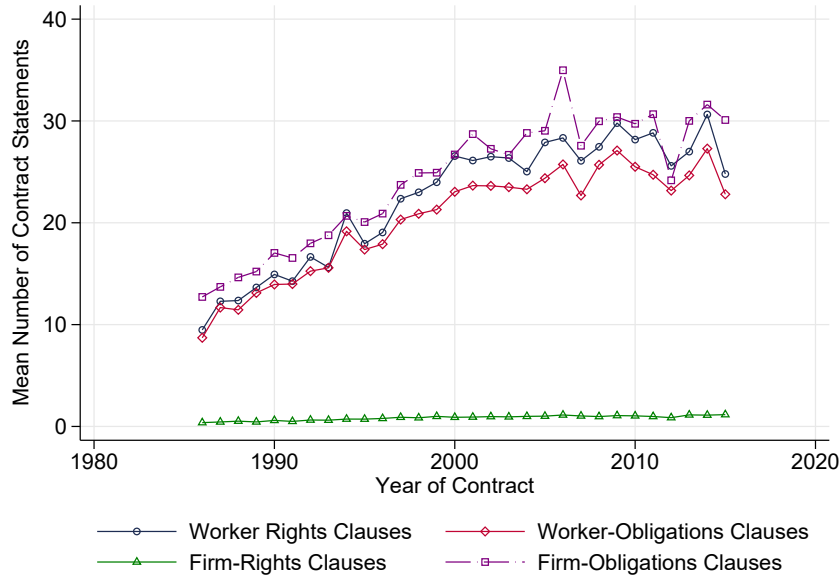
**Note:** Typology of clause types, word patterns, and corresponding examples.

Table A.4: Example Subject-Verb Tuples by Clause Type

| subject | obligations                                                                             | prohibitions                                                                                                | permissions                                                                                   | rights                                                                                         | others                                                                         |
|---------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| worker  | employee is required (41789)<br>employee shall be (21968)<br>employees shall be (14350) | employee shall not lose (3578)<br>employee shall not be (3517)<br>employee will not be (2997)               | employee may request (11120)<br>employee may elect (9148)<br>employee shall be allowed (7524) | employee shall be paid (61643)<br>employee shall receive (57367)<br>employee has (54772)       | employee is (181457)<br>employee works (42449)<br>employees are (24868)        |
| firm    | company agrees (83488)<br>employer agrees (76739)<br>employer shall provide (19909)     | board shall not be authorized (2397)<br>company shall not be (1403)<br>company will not be (1133)           | employer may require (4992)<br>employer may grant (4307)<br>company may require (2705)        | company has (9725)<br>board shall have (7767)<br>employer has (7506)                           | employer recognizes (13744)<br>company recognizes (13531)<br>company is (9089) |
| union   | union agrees (46060)<br>union shall notify (6113)<br>member is required (3034)          | union will not cause (967)<br>union will not engage (590)<br>representatives shall not suffer (316)         | representative may be (3452)<br>union may refer (1983)<br>union may submit (1785)             | union shall have (9463)<br>union has (5231)<br>member shall receive (4184)                     | union recognizes (15091)<br>member is (12139)<br>union is (10315)              |
| manager | supervisor shall give (1278)<br>management agrees (1272)<br>manager shall give (1057)   | supervisors shall not perform (343)<br>supervisors will not perform (284)<br>management will not take (139) | administrator may desire (566)<br>director may grant (384)<br>administrator may grant (377)   | principal shall receive (973)<br>administrator may have (808)<br>principal shall be paid (516) | supervisor is (2126)<br>management is fix (1375)<br>management is vest (1334)  |
| other   | there shall be (73307)<br>parties agree (70143)<br>there will be (33167)                | provisions shall apply (4494)<br>leave shall not exceed (4242)                                              | case may be (14213)<br>which may arise (6131)<br>which may be (6042)                          | who has (36467)<br>leave shall be granted (15557)<br>leave will be granted (10311)             | who is (141114)<br>there is (116098)<br>it is understood (102328)              |

**Note:** Most frequent examples of subject-verb tuples by clause type.

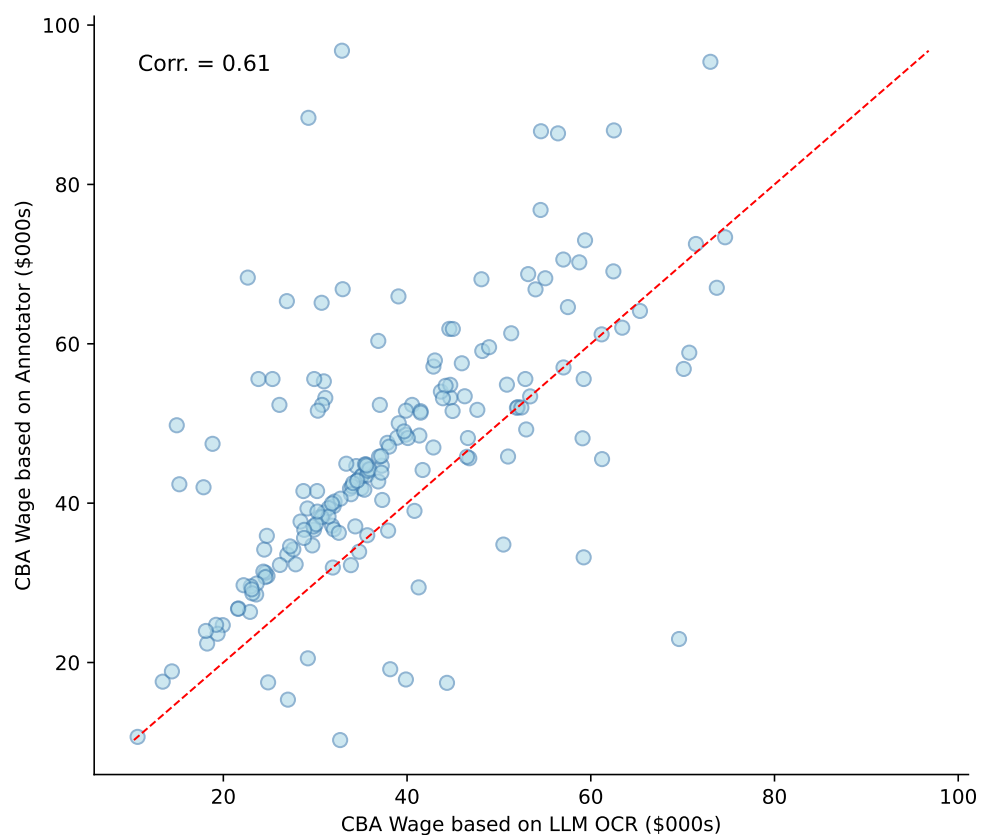
Figure A.4: Rights and Obligations Over Time, By Agent



**Note:** Mean number of rights and obligations for workers and firms, respectively, over time. Data source: Employment and Social Development Canada.



Figure A.5: Validation of LLM OCR-Based CBA Wages



**Note:** Binscatter plot of CBA wage based on annotator (y-axis) against CBA wage based on LLM OCR (x-axis). Observations with OCR-imputed annual wages below 10,000 or above 100,000 are excluded in both the validation and the main analysis. Data source: Employment and Social Development Canada.

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## A.3 Appendix Material: Exploring and Validating Worker Rights Clauses

### A.3.1 Pairwise Prompts and Expert-Annotation Agreement

All three models receive the system prompt “You are a helpful legal assistant.” For each clause, the first user prompt is “Analyze the following clause from a labor contract. Use step-by-step reasoning to: 1. Identify the main topic: What is this clause primarily about? 2. Type of provision: Is this an obligation, entitlement, permission, or constraint? Clause: \"{clause}\" Provide your analysis in the following format: - Topic: [main topic in 2-5 words] - Provision: [type]” We insert the returned topics into the second user prompt: “Which of these sentences from a union collective bargaining agreement is more likely to be interpreted as an entitlement, benefit, or amenity for workers? Sentence 1 (Topic: {topic1}):{sentence1} Sentence 2 (Topic: {topic2}):{sentence2} Answer 'Definitely 1', 'Probably 1', 'Probably 2', 'Definitely 2', or 'Neither', do not explain the answer.”

As an illustration, consider the pair “It is understood that upon thirty (30) calendar days written notice, either the supervisor or employee may terminate such an agreement” and “The two members thus appointed shall confer jointly in an endeavour to select a third member who shall be the chair of the board.” Gemma selects “Neither,” whereas GPT-OSS and Llama select one of the clauses. This example illustrates the role of the “Neither” option in ambiguous comparisons.

Nine respondents completed the annotation exercise. We exclude one respondent who reported no qualifying legal degree, leaving 160 annotations from eight legal experts covering 120 unique clause pairs. Eighty pairs were annotated once and 40 were annotated twice; the overlap consists of two pairs of experts who each evaluated 20 common comparisons. Respondents could select the first clause, the second clause, or neither clause as more beneficial to workers. We pool the “probably” and “definitely” responses for each clause. Agreement means that both evaluators select the same pooled response; a neither-related mismatch means that exactly one evaluator selects neither; and an opposite-clause disagreement means that one selects the first clause while the other selects the second. Worker-rights comparisons are those in which one member of the pair is classified as a worker entitlement.

Table A.5 reports the full decomposition. Across all 160 annotations, Gemma agrees with the expert in 64.4% of cases, differs only through a neither response in

Table A.5: Expert Validation of the LLM Pairwise Comparisons

| <b>Panel A. Annotation sample</b> |              |  |  |  |
|-----------------------------------|--------------|--|--|--|
| <b>Statistic</b>                  | <b>Value</b> |  |  |  |
| Expert annotations                | 160          |  |  |  |
| Legal experts                     | 8            |  |  |  |
| Unique clause pairs               | 120          |  |  |  |
| Pairs annotated once              | 80           |  |  |  |
| Pairs annotated twice             | 40           |  |  |  |

| <b>Panel B. Agreement decomposition</b>       |     |               |                      |                     |
|-----------------------------------------------|-----|---------------|----------------------|---------------------|
| Comparison                                    | N   | Agreement (%) | Neither mismatch (%) | Opposite clause (%) |
| Gemma vs. all expert annotations              | 160 | 64.4          | 24.4                 | 11.3                |
| Pairs including a worker-rights clause        | 21  | 71.4          | 19.0                 | 9.5                 |
| Expert vs. expert on twice-annotated pairs    | 40  | 52.5          | 27.5                 | 20.0                |
| Pairs including a worker-rights clause        | 7   | 42.9          | 42.9                 | 14.3                |
| Gemma vs. agreed expert consensus             | 21  | 81.0          | 14.3                 | 4.8                 |
| Pairs including a worker-rights clause        | 3   | 100.0         | 0.0                  | 0.0                 |
| Gemma vs. unanimous decisive expert consensus | 18  | 88.9          | 5.6                  | 5.6                 |

**Note:** Panel A reports the retained sample after excluding one respondent who reported no qualifying legal degree. In Panel B, probable and definite choices are pooled within clause. Agreement means that the evaluators select the same clause or both select neither. A neither mismatch means that exactly one evaluator selects neither; opposite clause means that one selects the first clause and the other selects the second. Worker-rights comparisons contain one clause classified as a worker entitlement. Agreed expert consensus restricts the duplicated pairs to those on which both experts give the same pooled response; unanimous decisive expert consensus further excludes a consensus of neither. Given the size of the expert sample, we treat this exercise as an external benchmark rather than a precise validation of the complete category ranking.

24.4%, and selects the opposite clause in 11.3%. For comparisons involving a worker-rights clause, the corresponding rates are 71.4%, 19.0%, and 9.5%. The 40 duplicated pairs also permit a direct expert-to-expert comparison. The experts agree in 52.5% of these pairs, differ through a neither response in 27.5%, and select opposite clauses in 20.0%. Most importantly for validation, Gemma agrees with the expert consensus in 17 of the 21 duplicated pairs on which the experts agree (81.0%), differs through neither in three (14.3%), and selects the opposite clause in only one (4.8%).

Figure A.6: Decomposition of Explained Variance in Worker Rights by Fixed Effects

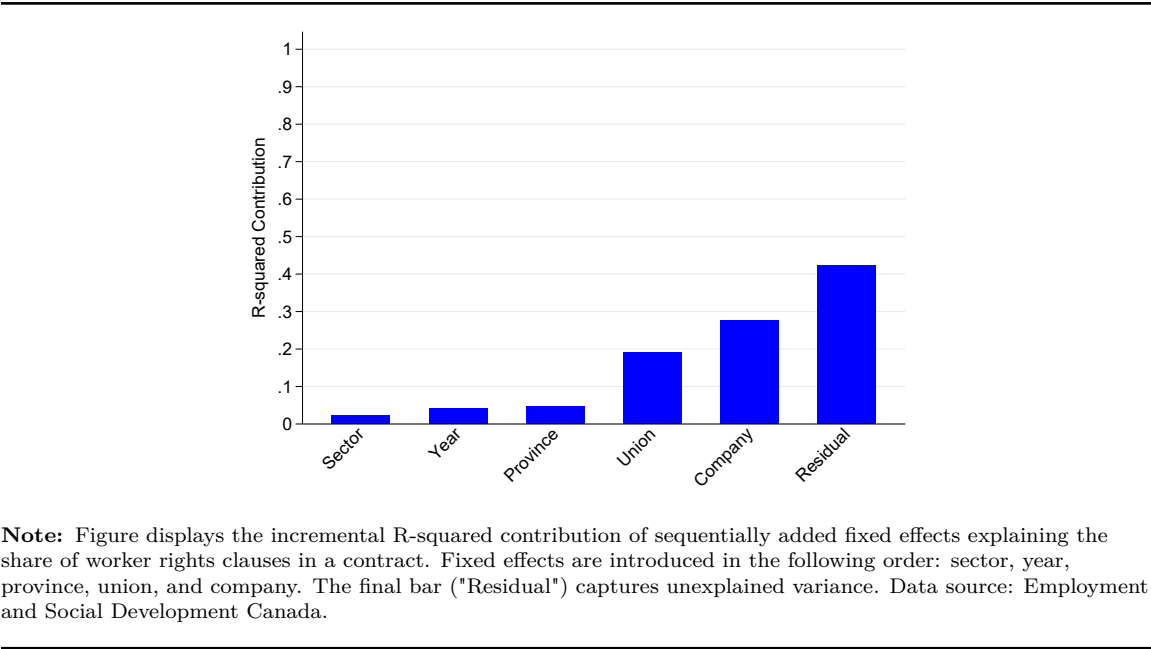
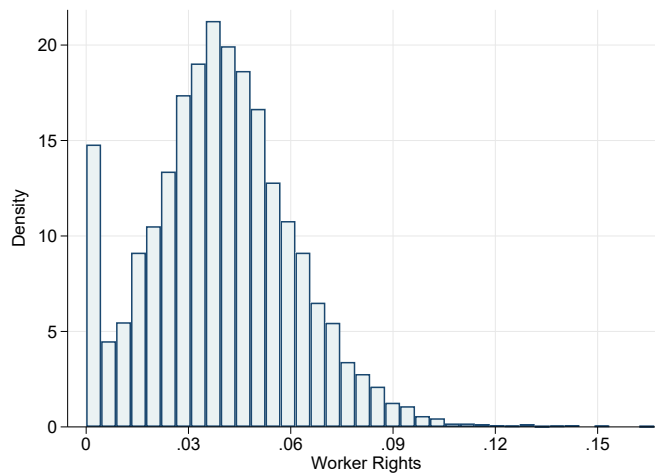


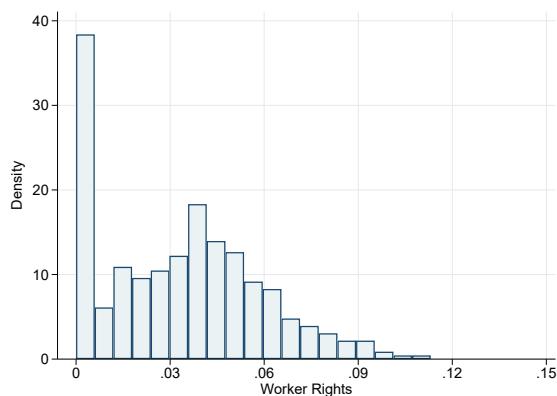
Figure A.7: Distribution of Worker Rights Clauses, by Firm, Union, and Sector

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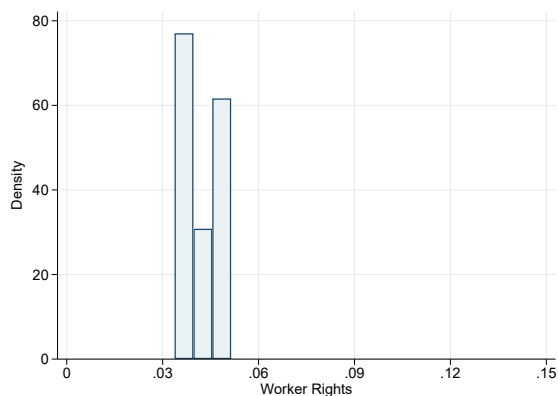
A. Worker Rights, by Firm



B. Worker Rights, by Union



C. Worker Rights, by Sector



**Note:** Histogram of share of worker rights, collapsed to the firm (Panel A), union (Panel B), and sector (Panel C) level. Data source: Employment and Social Development Canada.

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Table A.6: Share of Worker Rights Clauses, By Private Firm

| Firm                                                                                       | # of<br>Employees | Share of<br>worker rights |
|--------------------------------------------------------------------------------------------|-------------------|---------------------------|
| Great atlantic and pacific company canada, limited (005976a)                               | 8,000             | 0.0707                    |
| Metro ontario ; food basics franchisees (0050612a)                                         | 6,800             | 0.0696                    |
| British columbia telephone company (0402504a)                                              | 11,095            | 0.0684                    |
| Bc tel                                                                                     | 10,658            | 0.0657                    |
| Metro                                                                                      | 10,000            | 0.0620                    |
| Forest industrial relations limited                                                        | 10,550            | 0.0610                    |
| Steinberg                                                                                  | 9,000             | 0.0514                    |
| Steinberg (miracle food mart and ultra mart food and drug stores)                          | 10,000            | 0.0498                    |
| Telus corp.                                                                                | 13,700            | 0.0491                    |
| Miracle food mart of canada limited,div.great atlantic and pacific company                 | 7,770             | 0.0473                    |
| Metro ontario (retail)                                                                     | 9,400             | 0.0468                    |
| New dominion stores, division of the great atlantic and pacific company of canada, limited | 8,500             | 0.0439                    |
| Corporation des concessionnaires d'automobiles de montreal                                 | 15,570            | 0.0412                    |
| Association des constructeurs de routes et grands travaux du que.                          | 9,790             | 0.0411                    |
| Association de la construction du quebec                                                   | 23,700            | 0.0385                    |
| Overwaitea food group, save-on-foods bc and overwaitea foods                               | 7,920             | 0.0363                    |
| Stelco (hilton works)                                                                      | 7,797             | 0.0361                    |
| L'association des entrepreneurs de services d'edifices quebec                              | 7,220             | 0.0300                    |
| Labourers employer bargaining agency                                                       | 9,333             | 0.0297                    |
| Electrical trade bargaining association agency of the electric contractors association     | 14,500            | 0.0278                    |
| Carpenters employer bargaining agency                                                      | 12,700            | 0.0233                    |
| Mechanical contractors association ontario                                                 | 11,200            | 0.0210                    |
| Mechanical contractors association ontario                                                 | 8,000             | 0.0178                    |
| Electrical trade bargaining agency electrical contractors assn.                            | 14,000            | 0.0165                    |
| Ford motor company of canada, limited                                                      | 9,528             | 0.0164                    |
| Electrical trade bargaining agency of the electric contractors assn.                       | 14,250            | 0.0147                    |
| Institute of communications agencies and association of canadian advertisers               | 8,510             | 0.0003                    |
| Canadian media production association                                                      | 20,000            | 0.0000                    |
| Institute of communications and cdn. assn. of advertisers                                  | 7,755             | 0.0000                    |
| Canadian film and television production association (performers)                           | 6,870             | 0.0000                    |

**Note:** Share of worker rights clauses by private firms. Largest 30 firms by employment; displayed in descending order of share of worker rights. Data source: Employment and Social Development Canada.

Table A.7: Share of Worker Rights Clauses, By Union

| Union                                                                                                                 | # of Contracts |               | Share of<br>worker rights |
|-----------------------------------------------------------------------------------------------------------------------|----------------|---------------|---------------------------|
|                                                                                                                       | Private-Sector | Public-Sector |                           |
| Canadian Union of Public Employees                                                                                    | 234            | 1,850         | 0.0412                    |
| National Automobile, Aerospace, Transportation and General<br>Workers Union of Canada (CAW Canada)                    | 836            | 189           | 0.0377                    |
| Public Service Alliance of Canada                                                                                     | 317            | 664           | 0.0703                    |
| Ontario Nurses' Association                                                                                           | 29             | 650           | 0.0433                    |
| International Brotherhood of Teamsters                                                                                | 624            | 47            | 0.0472                    |
| Service Employees International Union                                                                                 | 128            | 510           | 0.0327                    |
| Ontario Secondary School Teachers' Federation                                                                         | 7              | 592           | 0.0369                    |
| Teamsters Canada                                                                                                      | 491            | 30            | 0.0459                    |
| Communications, Energy and Paperworkers Union of Canada                                                               | 454            | 42            | 0.0435                    |
| Ontario English Catholic Teachers' Association                                                                        | 0              | 450           | 0.0445                    |
| Ontario Public Service Employees Union                                                                                | 37             | 324           | 0.0351                    |
| Elementary Teachers' Federation of Ontario                                                                            | 0              | 334           | 0.0472                    |
| United Steelworkers of America                                                                                        | 303            | 18            | 0.0355                    |
| Alberta Teachers' Association                                                                                         | 1              | 320           | 0.0532                    |
| United Food and Commercial Workers International Union                                                                | 278            | 24            | 0.0452                    |
| Alberta Union of Provincial Employees                                                                                 | 44             | 238           | 0.0590                    |
| Christian Labour Association of Canada                                                                                | 231            | 30            | 0.0584                    |
| United Steel, Paper and Forestry, Rubber, Manufacturing,<br>Energy, Allied Industrial and Service Workers Intl. Union | 210            | 24            | 0.0366                    |
| United Food and Commercial Workers Canada                                                                             | 219            | 10            | 0.0487                    |
| International Association of Machinists and Aerospace<br>Workers                                                      | 221            | 0             | 0.0353                    |
| International Brotherhood of Electrical Workers                                                                       | 115            | 80            | 0.0434                    |
| International Union of Operating Engineers                                                                            | 128            | 63            | 0.0476                    |
| Canadian Merchant Service Guild                                                                                       | 167            | 3             | 0.0154                    |
| British Columbia Government and Service Employees' Union                                                              | 70             | 82            | 0.0426                    |
| Seafarers' International Union of Canada                                                                              | 132            | 0             | 0.0308                    |
| Professional Institute of the Public Service of Canada                                                                | 8              | 115           | 0.0817                    |
| Amalgamated Transit Union                                                                                             | 71             | 45            | 0.0410                    |
| Unifor                                                                                                                | 92             | 23            | 0.0393                    |
| Laborers' International Union of North America                                                                        | 96             | 18            | 0.0373                    |
| United Brotherhood of Carpenters and Joiners of America                                                               | 90             | 11            | 0.0373                    |

**Note:** Share of worker rights clauses by union. Unions ordered by number of contracts in the private and public sectors; top 30 unions displayed. Data source: Employment and Social Development Canada.

Table A.8: Worker Rights Clauses, By Sector

| Sector                    | Share of<br>worker rights |
|---------------------------|---------------------------|
| Construction              | 0.0337                    |
| Educational, Health       | 0.0409                    |
| Entertainment/Hospitality | 0.0378                    |
| Finance, real estate      | 0.0480                    |
| Information and culture   | 0.0413                    |
| Manufacturing             | 0.0395                    |
| Primary industries        | 0.0389                    |
| Public administration     | 0.0475                    |
| Transportation            | 0.0381                    |
| Utilities                 | 0.0460                    |
| Wholesale/Retail Trade    | 0.0514                    |

**Note:** Share of worker rights clauses, by sector. Data source: Employment and Social Development Canada.



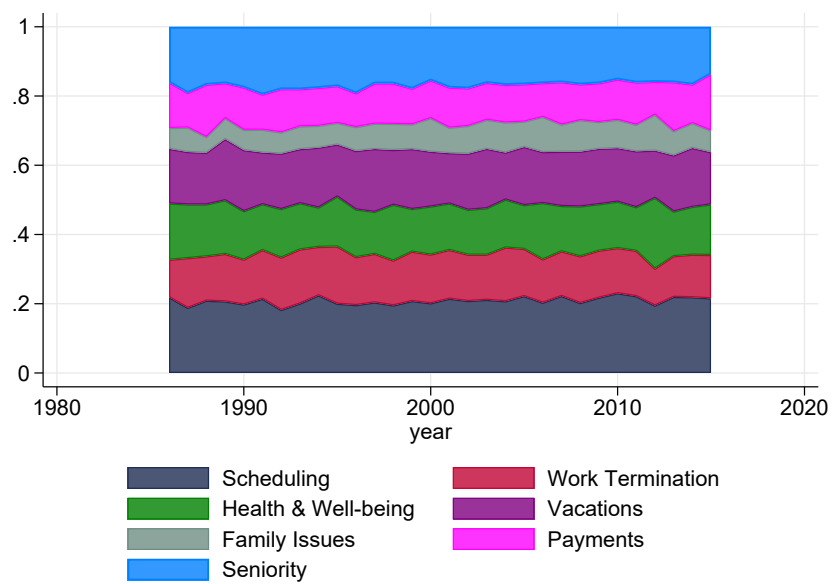
Table A.9: Example Worker Rights Clauses

- 
1. Employees should not be required to work more than two (2) hours after the end of their regular shift in such cases and shall be provided transportation by the Company, on request.
  2. Such employees shall be paid not later than three (3) weeks after the date of application.
  3. Where the Company schedules an employee to work in excess of seventy-seven (77) hours in one pay period, the employee will be paid for the excess hours at the applicable overtime rate.
  4. However, an employee will receive one day of seniority if he or she works 5 or more hours on an overtime shift on Saturday or Sunday.
  5. Standby Pay and Call-In Pay. An employee who is required by the Company to work overtime shall be paid at the rate of one and one-half times his applicable pro-rated hourly rate for time worked by him: (a) in excess of 8 hours in a work day
  6. Where an employee is prevented by circumstances beyond his control from returning to work on time, he shall be paid for the holidays.
  7. An employee who visits Occupational Health Services at the request of the Company following the completion of his shift will be paid in accordance with Section 16.01 and will be provided with transportation if necessary.
  8. An employee in such instances will be paid at his/her regular rate upon returning to work.
  9. If a general holiday falls on the regular pay day, employees shall be paid the last day worked before the general holiday.
  10. Employees who retire as well as current retirees and survivors will be provided with Life Insurance in the amount of \$6,000.
  11. The employee shall be entitled to additional time off for any holidays occurring within such vacation period.
  12. An employee terminated during his probationary period would be entitled to review under the grievance procedure up to and including Step 3.
  13. An employee not in a labour pool shall only be entitled to make application for an equal or higher rated job or, for a job which is in a line having a higher rated job than exists in his current line of promotion except that: 1 .
  14. However, where practicable, senior employees in each job shall be given the opportunity to perform any available work in that job, on their shift, within their Department.
  15. Any employee elected at the Federal or Provincial level will be granted a leave of absence without pay and without benefits, to extend to one (1) term in office.

**Note:** Sample of 15 worker-right clauses from the corpus (any typos come from OCR errors). Data source: Employment and Social Development Canada.

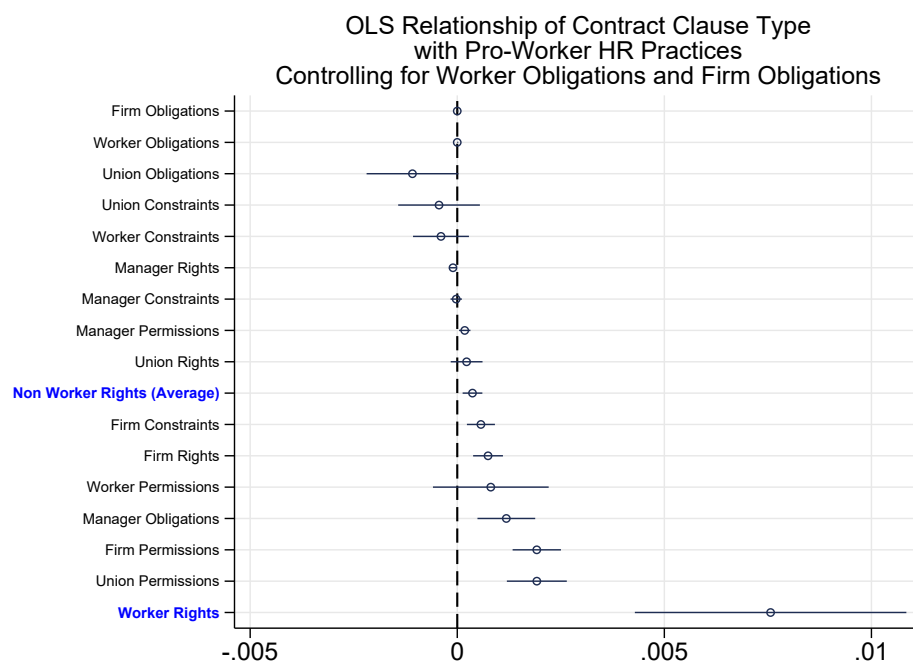
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Figure A.8: Worker Rights Clauses Topics Over Time



**Note:** Shares of topic clusters of worker rights clauses, over time. Data source: Employment and Social Development Canada.

Figure A.9: Clause Types and Pro-Worker HR, Conditioning on Obligations



**Note:** Figure presents coefficients and 95% confidence intervals of regression of contract clause types on index for Pro-Worker HR Practices. Each coefficient is from a separate OLS regression. Outcome: Clause type share (number of clauses of type in question over the number of all clauses). Treatment: Standardized index of Pro-Worker HR Practices, defined as sum of approval rates to six statements about worker practices; it increases in “managers care about workers”, “promotes good workers”, and “employees are valued,” and decreases in “focus on top talent”, “incentives”, and “fire poor performers”. Controls: Firm obligations and worker obligations, defined as share of clauses of given type (number of clauses of type in question over the number of all clauses). Inference: Heteroscedasticity-robust standard errors. Data sources: Employment and Social Development Canada, World Management Survey (Bloom et al., 2012).

Table A.10: Match of Broad Topics and Narrow Topics

| Broad Topic<br>(Share)            | Narrow Topic (Share)                   | Most Associated Words                                                                                        |
|-----------------------------------|----------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Scheduling<br>(0.188)             | Work Hours (0.058)                     | hours, work, rate, shift, regular, minimum, worked, called, scheduled, half                                  |
|                                   | Leave of Absence (0.039)               | leave, absence, granted, union, elected, loss, period, seniority, employer, year                             |
|                                   | Scheduling (0.030)                     | day, work, days, required, rest, scheduled, hours, consecutive, week, shift                                  |
|                                   | Overtime (0.026)                       | overtime, hours, work, worked, rate, regular, shift, required, half, scheduled                               |
|                                   | Part-Time Employment (0.023)           | hours, seniority, credit, basis, status, changed, service, worked, work, regular                             |
| Seniority (0.150)                 | Breaks (0.013)                         | rest, minute, 15, break, shift, period, minutes, hours, periods, half                                        |
|                                   | Seniority-Based Benefits (0.039)       | service, year, years, plan, benefits, retirement, salary, date, month, 00                                    |
|                                   | Position Classification (0.036)        | rate, classification, higher, job, position, salary, transferred, new, assigned, lower                       |
|                                   | Job Security (0.030)                   | position, job, temporary, given, vacancy, hired, nurse, opportunity, offered, months                         |
|                                   | Seniority & Promotion/Transfer (0.030) | seniority, given, senior, preference, selected, job, ability, qualifications, positions, classification      |
| Vacations (0.146)                 | Probation Period (0.015)               | probationary, period, agreement, rights, probation, privileges, completion, hired, completed, seniority      |
|                                   | Vacations (0.045)                      | vacation, year, period, entitlement, annual, leave, employment, earned, following, service                   |
|                                   | Seniority-Based Vacation (0.038)       | vacation, years, service, year, weeks, continuous, completed, days, annual, percent                          |
|                                   | Holiday Pay (0.037)                    | holiday, day, holidays, ory, falls, vacation, general, following, work, regular                              |
|                                   | Holiday Work Pay (0.026)               | holiday, hours, rate, day, worked, holidays, regular, ory, work, half                                        |
| Health &<br>Well-being<br>(0.117) | Workplace safety (0.054)               | union, agreement, required, provided, covered, granted, work, given, company, collective                     |
|                                   | Sick Leave (0.025)                     | sick, leave, credits, days, illness, granted, absence, month, year, injury                                   |
|                                   | Workplace Injuries (0.024)             | injury, compensation, injured, work, workers, disability, accident, medical, benefits, shift                 |
|                                   | Meals (0.015)                          | meal, lunch, period, hours, hour, overtime, work, break, half, shift                                         |
| Work<br>Termination<br>(0.117)    | Recall (0.032)                         | laid, layoff, recall, given, lay, hired, new, opportunity, work, recalled                                    |
|                                   | Grievance & Discipline (0.031)         | grievance, steward, union, discipline, discharge, discharged, notified, representative, suspended, procedure |
|                                   | Notice Requirements (0.027)            | notice, notified, given, days, layoff, change, advance, working, written, writing                            |
|                                   | Termination (0.026)                    | severance, employment, service, notice, termination, laid, continuous, layoff, terminated, year              |
| Payments (0.099)                  | Payment Rules (0.051)                  | rate, weekly, regular, day, hourly, agreement, hours, work, bi, half                                         |
|                                   | Shift Premiums (0.025)                 | shift, hour, premium, cents, hours, worked, 00, rate, regular, hourly                                        |
|                                   | Reimbursements (0.022)                 | travel, transportation, expenses, reimbursed, allowance, traveling, vehicle, employer, use, business         |
| Family Issues<br>(0.055)          | Bereavement Leave (0.028)              | death, law, bereavement, leave, funeral, days, granted, family, immediate, day                               |
|                                   | Parental Leave (0.027)                 | leave, parental, child, maternity, weeks, pregnancy, granted, adoption, birth, pregnant                      |
| Others (0.127)                    | Teacher Compensation (0.066)           | teacher, teachers, school, salary, occasional, teaching, board, year, experience, day,                       |
|                                   | Teacher Leave (0.029)                  | teacher, leave, sick, school, year, granted, teachers, days, absence, board                                  |
|                                   | Personnel Records (0.024)              | copy, file, given, written, provided, request, performance, review, personnel, appraisal                     |
|                                   | Jury duty (0.009)                      | jury, witness, duty, court, subpoenaed, difference, required, day, received, serve                           |

**Note:** Label, share (relative frequency), and 10 most associated words of topic clusters describing worker rights. Most associated words ordered by association strength. Data source: Employment and Social Development Canada.

Table A.11: Correlation Between Worker Rights and Firm Obligations, By Topic

| Overall<br>(Correlation) | Broad Topic<br>(Correlation)      | Narrow Topic (Correlation)             |
|--------------------------|-----------------------------------|----------------------------------------|
| Overall(0.570)           | Scheduling<br>(0.180)             | Work Hours (0.014)                     |
|                          |                                   | Leave of Absence (0.221)               |
|                          |                                   | Scheduling (.)                         |
|                          |                                   | Overtime (0.176)                       |
|                          |                                   | Part-Time Employment (.)               |
|                          |                                   | Breaks (.)                             |
|                          | Seniority (0.208)                 | Seniority-Based Benefits (0.002)       |
|                          |                                   | Position Classification (0.110)        |
|                          |                                   | Job Security (0.026)                   |
|                          |                                   | Seniority & Promotion/Transfer (0.080) |
|                          |                                   | Probation Period (0.020)               |
|                          | Vacations (0.187)                 | Vacations (0.220)                      |
|                          |                                   | Seniority-Based Vacation (.)           |
|                          |                                   | Holiday Pay (.)                        |
|                          |                                   | Holiday Work Pay (0.023)               |
|                          | Health &<br>Well-being<br>(0.107) | Workplace safety (.)                   |
|                          |                                   | Sick Leave (.)                         |
|                          |                                   | Workplace Injuries (0.063)             |
|                          |                                   | Meals (0.052)                          |
|                          | Work<br>Termination<br>(0.146)    | Recall (0.052)                         |
|                          |                                   | Grievance & Discipline (0.092)         |
|                          |                                   | Notice Requirements (0.033)            |
|                          |                                   | Termination (.)                        |
|                          | Payments (0.253)                  | Payment Rules (0.055)                  |
|                          |                                   | Shift Premiums (0.075)                 |
|                          |                                   | Reimbursements (0.332)                 |
|                          | Family Issues<br>(0.165)          | Bereavement Leave (.)                  |
|                          |                                   | Parental Leave (0.165)                 |
|                          | Others (0.741)                    | Teacher Compensation (0.829)           |
|                          |                                   | Teacher Leave (.)                      |
|                          |                                   | Personnel Records (0.023)              |
|                          |                                   | Jury duty (.)                          |

**Note:** Label and correlation for broad and narrow topics when categories match. The "." indicates that there is no matching topic category. Topics are sorted by relative frequency as in Table A.10. Data source: Employment and Social Development Canada.

Table A.12: Firm and Contract Characteristics, by Full CBA and Merged Sample

|                        | Full Sample Period       |                            |         | 2010                     |                            |         |
|------------------------|--------------------------|----------------------------|---------|--------------------------|----------------------------|---------|
|                        | Mean,<br>Full CBA Sample | Mean,<br>Merged WMS Sample | P-value | Mean,<br>Full CBA Sample | Mean,<br>Merged WMS Sample | P-value |
| Private-Sector         | 0.476                    | 1.000                      | 0.000   | 0.527                    | 1.000                      | 0.000   |
| Number of Employees    | 689.759                  | 788.602                    | 0.488   | 838.200                  | 194.429                    | 0.000   |
| Firm Exit              | 0.165                    | 0.149                      | 0.492   | 0.191                    | 0.429                      | 0.284   |
| Firm Entry             | 0.165                    | 0.149                      | 0.492   | 0.111                    | 0.286                      | 0.380   |
| Duration (years)       | 2.596                    | 3.112                      | 0.000   | 2.831                    | 3.143                      | 0.523   |
| Has COLA               | 0.283                    | 0.241                      | 0.127   | 0.307                    | 0.143                      | 0.295   |
| Contract Length        | 535.309                  | 554.546                    | 0.371   | 635.324                  | 572.571                    | 0.227   |
| Number of Observations | 32,402                   | 249                        |         | 1,143                    | 7                          |         |

**Note:** Table presents mean value for firm and contract characteristics from full CBA and the merged sample, separately for the full sample period and for the year of 2010 only. Data sources: Employment and Social Development Canada, World Management Survey (Bloom et al., 2012).

Table A.13: Pro-Worker HR Practices, by WMS and Merged Sample

|                  |                                                        | Mean,<br>WMS Firms | Mean,<br>Merged Sample | P-value |
|------------------|--------------------------------------------------------|--------------------|------------------------|---------|
| Overall Index    | Cumulative Pro-Worker Anti-Incentive Talent Management | 0.55               | 0.68                   | 0.734   |
| Index Components | Talent Recruitment/Management                          | 2.63               | 2.72                   | 0.601   |
|                  | Incentive/Performance Pay                              | 2.34               | 2.22                   | 0.504   |
|                  | Re/Moving Weak Worker                                  | 3.23               | 3.41                   | 0.286   |
|                  | Performance Based Promotion                            | 2.73               | 3.06                   | 0.073   |
|                  | Employee Value Proposition                             | 3.24               | 3.39                   | 0.444   |
|                  | Skill Retention                                        | 2.41               | 2.72                   | 0.085   |

**Note:** Table presents mean value for pro-worker HR practices components in union firms from World Management Survey and the merged sample. Index of Pro-Worker HR Practices, defined as sum of approval rates to six statements about worker practices; it increases in “managers care about workers”, “promotes good workers”, and “employees are valued,” and decreases in “focus on top talent”, “incentives”, and “fire poor performers”. Data sources: World Management Survey (Bloom et al., 2012).

Table A.14: Predictive Performance for Worker Rights by Firm Characteristics

|                        | Worker Rights Clauses |              |             |                |                 |
|------------------------|-----------------------|--------------|-------------|----------------|-----------------|
|                        | COLA Clause           | + Firm Entry | + Firm Exit | + Private Firm | + Log Firm Size |
| R-Squared              | 0.0005                | 0.0022       | 0.0023      | 0.0053         | 0.0089          |
| Number of Observations | 32,402                | 29,717       | 29,717      | 29,717         | 28,329          |

**Note:** R-squared values for predicting worker rights clauses by adding firm characteristics cumulatively indicated in the column header. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards.

Table A.15: Pro-Worker HR Practices, by Union and Non-union

|                        |                                                        | <b>Union</b> |      | <b>Non-union</b> |      |
|------------------------|--------------------------------------------------------|--------------|------|------------------|------|
|                        |                                                        | Mean         | S.D. | Mean             | S.D. |
| Overall Index          | Cumulative Pro-Worker Anti-Incentive Talent Management | 0.56         | 1.92 | 0.36             | 1.99 |
| Index Components       | Talent Recruitment/Management                          | 2.64         | 0.98 | 2.71             | 0.95 |
|                        | Incentive/Performance Pay                              | 2.32         | 0.86 | 2.80             | 1.06 |
|                        | Re/Moving Weak Worker                                  | 3.26         | 0.87 | 3.64             | 0.80 |
|                        | Performance Based Promotion                            | 2.78         | 0.92 | 3.34             | 0.90 |
|                        | Employee Value Proposition                             | 3.26         | 0.92 | 3.33             | 0.89 |
|                        | Skill Retention                                        | 2.46         | 0.94 | 2.58             | 1.02 |
| Number of Observations |                                                        | 210          |      | 209              |      |

**Note:** Table presents summary statistics of pro-worker HR practice index and its underlying components, split by union and non-union status. Index of Pro-Worker HR Practices, defined as sum of approval rates to six statements about worker practices; it increases in “managers care about workers”, “promotes good workers”, and “employees are valued,” and decreases in “focus on top talent”, “incentives”, and “fire poor performers”. Data sources: World Management Survey (Bloom et al., 2012).

### A.3.2 Comparison with an Alternative Supervised-Learning-Based Measure

An alternative approach to measuring pro-worker content in labor union contracts is to identify text features that are associated with higher employment at a firm. That approach is motivated by the idea that higher employment, controlling for wages, reflects higher worker utility at the firm, as in recent models of monopsonistic labor markets with amenities (Bagger and Lentz, 2019; Lamadon et al., 2022; Volpe, 2026). Our approach is similar to Lagos (2025), who extracts contract features that predict firm-specific voluntary transitions. In a variant of this method designed to identify pro-women benefits, Corradini et al. (2025) predict higher female employment with contract text features, adjusting for gender wage premia.

We construct a “Text-Predicted Excess Employment” index as follows. We vectorize the contracts using LDA to produce topic shares  $\vec{L}$ . We run OLS to predict higher firm employment based on the contract features, adjusting for wages,

$$N_{psit} = \rho \vec{L}_{psit} + wage_{pst} + \alpha_{ps} + \alpha_{st} + X_{psit}\beta + \epsilon_{psit}, \quad (3)$$

with the components described as follows.  $N_{psit}$  is the outcome variable defined as the logarithmized number of employees of firm/contract  $i$  in province  $p$ , sector  $s$ , and year  $t$ .  $\vec{L}_{psit}$  is the explanatory variable of interest, defined as the vector of topic shares constructed from contract text using Latent Dirichlet Allocation, with  $\rho$  being the corresponding OLS coefficients. We also include  $wage_{pst}$ , which denotes the imputed province-sector-year wage from the LFS, as well as province-by-sector fixed effects ( $\alpha_{ps}$ ), and year-by-sector fixed effects ( $\alpha_{st}$ ). Results are similar, but less precise, if we additionally include firm fixed effects in  $X_{psit}$ .

We now have the contract-predicted employment  $\hat{N}(\vec{L})$  from the fitted OLS regression. The regression model extracts contract topics that contribute to higher contract-covered employment, conditional on wages — that is, contract terms that allow the firm to have higher employment than competitors paying similar wages.

Appendix Figure A.10 provides the main comparison for this excess employment measure (text-predicted firm size). The excess-employment index is significantly positively correlated with our parser-based measure of worker rights. However, it is not correlated with the pro-worker HR practices index from Bloom and Van Reenen (2010). In other words, the parser-based measure appears to pick up the common



worker rights dimension reflected (with noise) in both proxies, which explains why it correlates with each despite their lack of correlation with one another. That gives some additional support for using our parser-based measure.

### **A.3.3 Alternative Methods for Measuring Worker Rights**

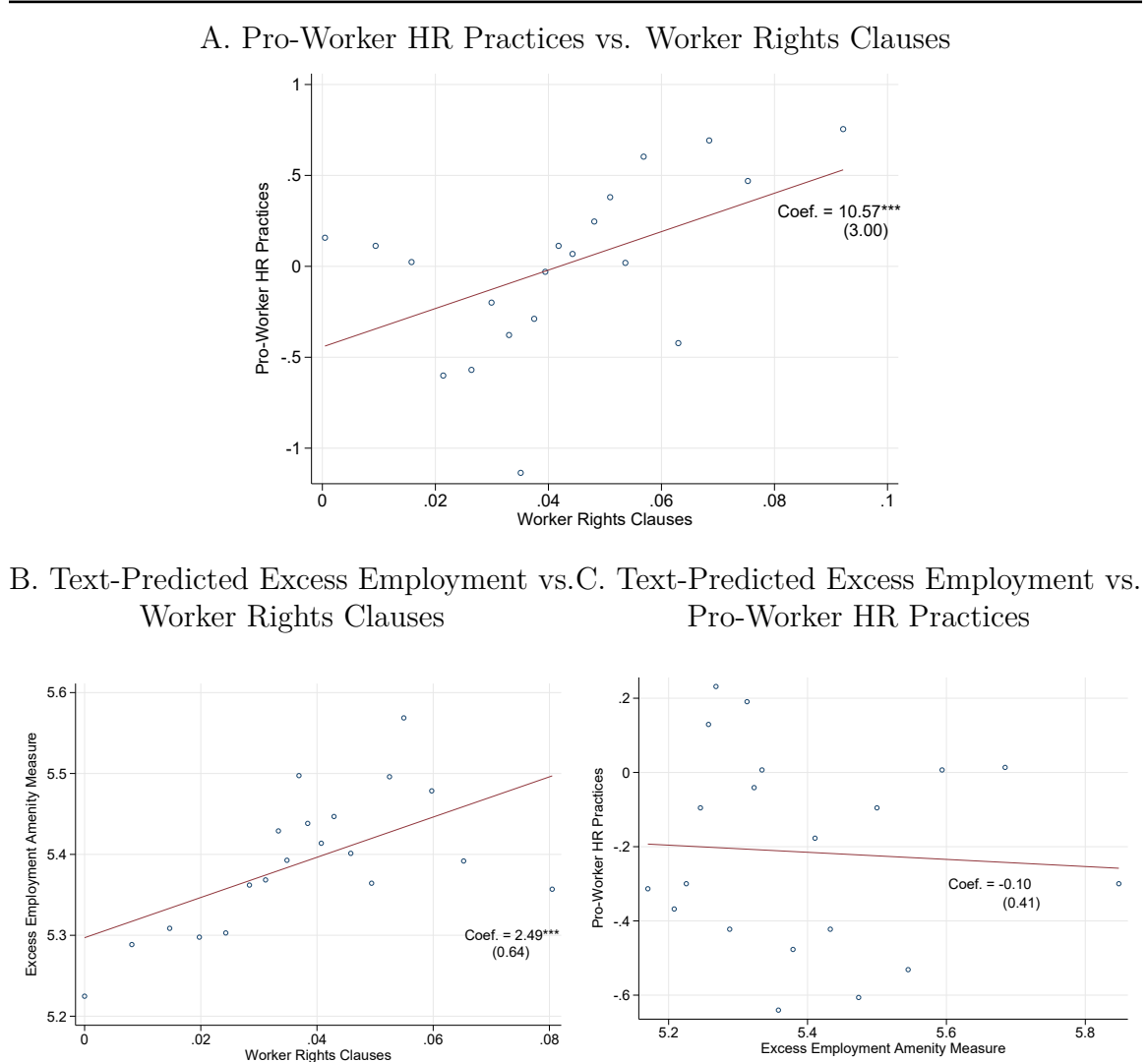
Our structural parser-based approach to language is one of several methods that can, in principle, be employed to extract worker rights from contract texts, or to measure worker rights more generally (Gentzkow et al., 2019; Ash and Hansen, 2023). In the following, we discuss the benefits of the parser-based approach relative to some potential alternatives.

A core assumption behind our approach is that small differences in complex language dependencies can significantly alter the legal content of a contract. For example, take these three clauses: “Workers must work from home”, “Workers may work from home”, “Workers may not work from home”. They are all very close to each other in the standard language distance metrics, including those computed using sentence embeddings (e.g. Reimers and Gurevych, 2019). Our grammar-based method identifies the critical verb modifiers in terms of modality (may vs. must) and negation (may vs. may not). Unlike a token-based or embedding-based approach, the structural grammar parse more faithfully captures the information in legal text that matters for judges, arbitrators, and lawyers.

To elaborate, take as a first alternative a dictionary approach, which would count rights-related terms in the contracts. For example, “health benefits” likely favors workers. A problem with this approach is that it is difficult to prepare a sufficiently complete list of pro-worker terms. And even with such terms, dictionaries miss important context. Some obvious examples include “new employees do not receive health benefits”, or “only managers are entitled to health benefits”. Our parser-based approach addresses the issue of context and negation from dictionaries, as it brings in the relationships between agents and actions through syntax.

Second, one could use supervised learning in which humans annotate a sample of clauses as pro-worker or granting rights, and then train a classifier to scale up to the whole dataset. A roadblock to this approach is that most clauses are difficult to classify consistently, even for labor lawyers. Further, even if making those labels was possible in practice, statistical models would still require a very large dataset of annotations to learn that small linguistic changes can have large legal implications,

Figure A.10: Worker Rights Clauses, Pro-Worker HR Practices, and Text-Predicted Excess Employment



**Note:** Panel A: Binscatter plot of worker rights clauses (horizontal axis) and index for Pro-Worker HR Practices (vertical axis). Panel B: Binscatter plot of worker rights clauses (horizontal axis) and text-predicted excess employment index (vertical axis, defined in Appendix Section A.3.2). Panel C: Binscatter plot of excess employment index (horizontal axis) and index for Pro-Worker HR Practices (vertical axis). “Worker Rights Clauses” is defined as share of worker rights clauses (number of worker rights clauses over the number of all clauses). Index of Pro-Worker HR Practices is defined as standardized sum of approval rates to six statements about worker practices; it increases in “managers care about workers”, “promotes good workers”, and “employees are valued,” and decreases in “focus on top talent”, “incentives”, and “fire poor performers”. “Excess employment amenity measure” or “text-predicted excess employment” refer to the text-predicted firm size, controlling for wages, as described in the text. Worker right measure is significantly positively correlated with Pro-Worker HR Practices (Panel A). Excess employment is significantly positively correlated with worker rights measure (Panel B), but not correlated with the pro-worker HR practices (Panel C). Data sources: Employment and Social Development Canada, World Management Survey (Bloom et al., 2012).

especially for edge cases that may be rare in the existing corpus. Our approach addresses the issues with human annotations by focusing on specific syntactic features that have a structural legal meaning. It provides a generalizable rule to broadly label sentences without supervised learning.

Third, one could use supervised learning to scale text that is predictive of a meta-data variable indicating a pro-worker orientation. An example of this approach is Lagos (2025), who extracts contract text features that are predictive of a quits-based preference ranking of firms, conditional on wages. A downside of this approach is that one cannot fully control for the fact that quits are endogenously and jointly determined with the contract characteristics. This could introduce substantial confounding variation which may not reflect worker utility. Our parser approach, unlike the quits prediction approach, has no supervised outcome that could be correlated with omitted variables. The relevant predictors are strictly and manually regularized with legal knowledge. We view these two approaches as complements, however; for example, Lagos (2025) implements our approach in parallel with the supervised approach on Brazilian contracts, and he finds similar results: improvements in union bargaining power increase the rights of workers and decrease those of employers.

A fourth approach would be to use a large language model (LLM) to annotate clauses as being favorable to workers or not (Ash et al., 2025). LLMs are a powerful and promising approach. As described in the main text, we use both BERT-based and GPT-based models in different ways to support our analysis. But at present, those methods do not provide a substitute for a legally informed structural approach. For example, while a fine-tuned BERT could achieve strong predictive performance in supervised settings, it does not resolve challenges related to obtaining well-calibrated human annotation or potential confounding in supervised outcomes. Moreover, LLMs tend to miss nuance in language such as negation (Hossain et al., 2022) and modality (Park et al., 2025), both of which are fundamental for interpreting the legal language in CBAs correctly.

Aligned generative LLMs like GPT could improve on BERT by drawing on implicit legal expertise learned from their training corpus and during post-training alignment. But current LLMs are general-purpose tools that have only a basic understanding of Canadian labor law, or law more generally (e.g. Dahl et al., 2024). Beyond human annotations used for model alignment, these model representations are not informed by real-world inputs or outputs, that is, factors outside the text. By contrast, our

rule-based parser explicitly embeds such legal knowledge through its rules, which are first-order for contract interpretation and design. As Vafa et al. (2024) point out, LLMs do not have a structural model of the world – that is, they do not correctly infer the structure of deterministic systems (e.g. logic or navigation). Hence, they can give misleading outputs for valid inputs.<sup>38</sup> Development of language models that integrate structured knowledge – for example through information retrieval, grammar-constrained decoding, or verifiable reasoning – is ongoing and promising. But for now our structural grammar-based approach, founded in a theory of how legal language creates duties and obligations, is likely to be preferred over pure LLM-based approaches.

The contrast between LLMs and our approach is an instance of a much larger, foundational, debate in linguistics. Should researchers focus on behavioral regularities in observed language use (Norvig, 2012), or instead on formal grammars describing the space of possible linguistic constructs (Chomsky, 1959)? Unlike LLM-based methods that do not have an internal “world model” of legal reasoning (Vafa et al., 2024), our measure is built around a structural model of contract writing. That makes our approach transparent, reproducible, and interpretable by humans.

Beyond these NLP alternatives, a more foundational question is: Why use text at all to measure worker rights? That is, why not measure wages and maybe some well-defined benefits like health insurance? A first answer is that the contract is a commitment: the legal right to a benefit is valuable above and beyond the benefit itself, as it is more difficult to revoke. Violations of contracted rights give unionized workers the right to grieve, to go to arbitration, and to strike, which simple retractions of non-contracted benefits do not. A second answer is that many things that workers care about are not wages or pecuniary benefits. Consistent with workers valuing such provisions, the contract terms clearly matter to the parties to an agreement. Firms and unions expend significant time, money, and energy in contract drafting, including the expensive expert services of labor lawyers (see Ashenfelter et al., 2013; McAlevev and Lawlor, 2023).

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<sup>38</sup>A simple clause example that “tricks” recent versions of ChatGPT into identifying a worker right is: “School principals are cherished workers and are entitled to 6 weeks of vacation annually.” The trick is that principals are managers, not workers. In our framework, this clause would properly be labeled as a management right, rather than a worker right.

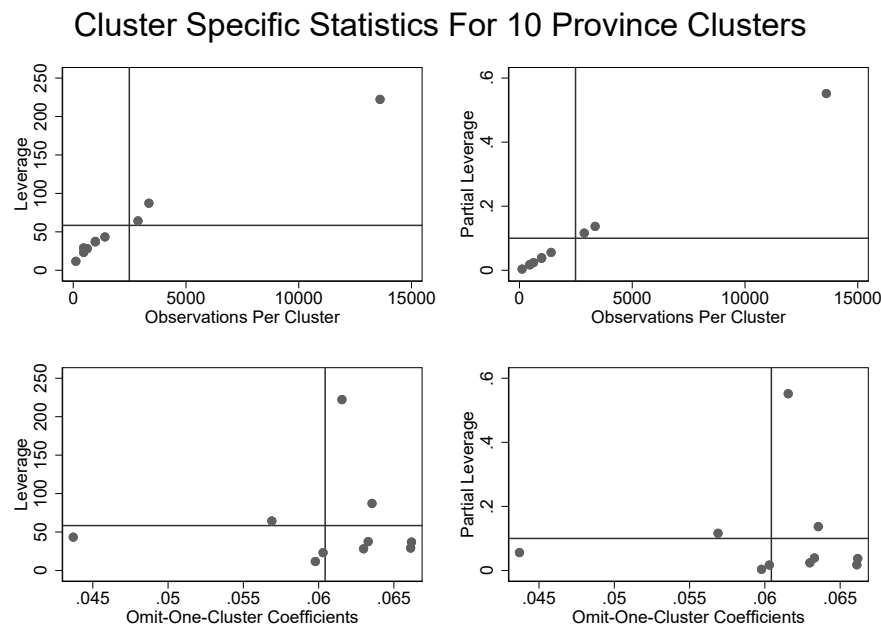
## A.4 Appendix Material: Supporting Results

Table A.16: Effect of Tax Rate on Worker Rights: P-Values Under Alternative Cluster-Robust Inference Methods

|                                              | Inference method                       |       |
|----------------------------------------------|----------------------------------------|-------|
|                                              | (1)                                    | (2)   |
| Panel A: Asymptotic cluster-robust inference |                                        |       |
|                                              | CV1 (cluster-robust)                   | 0.003 |
|                                              | CV3 (cluster jackknife)                | 0.010 |
|                                              | CV3j (cluster jackknife)               | 0.010 |
| Panel B: Wild cluster bootstrap inference    |                                        |       |
|                                              | CGM wild cluster bootstrap             | 0.000 |
|                                              | WCR-C (restricted, classic)            | 0.004 |
|                                              | WCU-C (unrestricted, classic)          | 0.000 |
|                                              | WCR-S (restricted, jackknife scores)   | 0.037 |
|                                              | WCU-S (unrestricted, jackknife scores) | 0.008 |

**Note:** Table reports two-sided p-values under alternative cluster-robust inference methods following Cameron et al. (2011) and MacKinnon et al. (2023a) for the main coefficient of log tax rate on worker rights, reported in Table 5, col. 2. Clusters calculated at the province level. CV1 denotes the conventional cluster-robust variance estimator based on unadjusted empirical cluster score vectors, with inference using the  $t(G-1)$  reference distribution, where  $G$  is the number of clusters. CV3 denotes the cluster jackknife variance estimator computed as a leave-one-cluster-out estimator centered on the full-sample coefficient estimate. CV3j denotes the cluster jackknife variance estimator centered on the average of the leave-one-cluster-out coefficient estimates. CGM wild cluster bootstrap denotes the Cameron–Gelbach–Miller wild cluster bootstrap, which applies Rademacher weights at the cluster level to regression residuals and computes bootstrap t-statistics under the null hypothesis using conventional cluster-robust standard errors (Cameron et al., 2008, 2011). WCR-C denotes the classic restricted wild cluster bootstrap based on unadjusted empirical score vectors and CV1 standard errors, with the bootstrap data-generating process imposing the null hypothesis. WCU-C denotes the classic unrestricted wild cluster bootstrap based on unadjusted empirical score vectors and CV1 standard errors, with the bootstrap data-generating process not imposing the null hypothesis. WCR-S denotes the restricted wild cluster bootstrap based on jackknife-adjusted score vectors, with inference computed using CV1 standard errors (MacKinnon et al., 2023b). WCU-S denotes the unrestricted wild cluster bootstrap based on jackknife-adjusted score vectors, with inference computed using CV1 standard errors. Bootstrap p-values are computed using the absolute value of the t-statistic and are based on  $B = 2^{10} = 1,024$  bootstrap replications using the Rademacher distribution. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards.

Figure A.11: Effect of Tax Rate on Worker Rights Clauses: Cluster Diagnostics



**Note:** Figure reports cluster diagnostic statistics following the summclust procedure of MacKinnon et al. (2023c) for the main coefficient of log tax rate on worker rights, reported in Table 5, col. 2. Clusters are defined at the province level, yielding 10 clusters. The figure displays cluster leverage and partial leverage measures plotted against the number of observations per cluster, as well as against omit-one-cluster coefficient estimates. Cluster leverage measures the overall influence of each cluster on the estimation of the regression coefficients. Partial leverage measures the influence of each cluster on the estimation of the coefficient of interest (effect of log tax rate on worker rights), conditional on the remaining regressors. Omit-one-cluster coefficients are computed by re-estimating the regression while sequentially excluding each cluster. Vertical and horizontal reference lines indicate benchmark thresholds used in the summclust diagnostic to flag potentially influential clusters. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards.

Table A.17: Robustness: Labor Income Tax Rate and Worker Rights Clauses

|                                                              | (1)                 | (2)                 | (3)                 | (4)                 | (5)                 | (6)                 | (7)                 | Worker Rights Clauses |                     |                     |                     |                     |                     |                     |                     |                     |                     | (18)               |
|--------------------------------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|-----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|--------------------|
| Log Income Tax Rate                                          | 0.061***<br>(0.015) | 0.037***<br>(0.012) | 0.041***<br>(0.014) | 0.049***<br>(0.014) | 0.061***<br>(0.014) | 0.059***<br>(0.017) | 0.060***<br>(0.015) | 0.059***<br>(0.016)   | 0.060***<br>(0.016) | 0.059***<br>(0.016) | 0.046***<br>(0.014) | 0.068***<br>(0.019) | 0.095***<br>(0.024) | 0.035***<br>(0.013) | 0.041***<br>(0.013) | 0.061***<br>(0.015) | 0.037***<br>(0.011) | 0.041**<br>(0.013) |
| R-Squared                                                    | 0.15                | 0.16                | 0.55                | 0.34                | 0.15                | 0.15                | 0.15                | 0.15                  | 0.15                | 0.18                | 0.30                | 0.16                | 0.18                | 0.47                | 0.16                | 0.18                | 0.17                | 0.18               |
| Number of Observations                                       | 24,826              | 24,826              | 22,254              | 10,841              | 24,826              | 24,826              | 24,826              | 24,826                | 24,826              | 24,826              | 24,826              | 24,826              | 24,826              | 24,826              | 23,043              | 11,210              | 21,070              | 21,070             |
| Province-Sector FEs                                          | X                   | X                   | X                   | X                   | X                   | X                   | X                   | X                     | X                   | X                   | X                   | X                   | X                   | X                   | X                   | X                   | X                   | X                  |
| Sector-Year FEs                                              |                     |                     |                     |                     |                     |                     |                     |                       |                     |                     |                     |                     |                     |                     |                     |                     |                     |                    |
| Province Trends                                              |                     |                     |                     |                     |                     |                     |                     |                       |                     |                     |                     |                     |                     |                     |                     |                     |                     |                    |
| Firm Fixed Effects                                           |                     |                     |                     |                     |                     |                     |                     |                       |                     |                     |                     |                     |                     |                     |                     |                     |                     |                    |
| Union Fixed Effects                                          |                     |                     |                     |                     |                     |                     |                     |                       |                     |                     |                     |                     |                     |                     |                     |                     |                     |                    |
| Cluster by Province-Sector                                   |                     |                     |                     |                     |                     |                     |                     |                       |                     |                     |                     |                     |                     |                     |                     |                     |                     |                    |
| Pro-Union Law Controls                                       |                     |                     |                     |                     |                     |                     |                     |                       |                     |                     |                     |                     |                     |                     |                     |                     |                     |                    |
| Anti-Union Law Controls                                      |                     |                     |                     |                     |                     |                     |                     |                       |                     |                     |                     |                     |                     |                     |                     |                     |                     |                    |
| NDP Party Control                                            |                     |                     |                     |                     |                     |                     |                     |                       |                     |                     |                     |                     |                     |                     |                     |                     |                     |                    |
| Employment Control                                           |                     |                     |                     |                     |                     |                     |                     |                       |                     |                     |                     |                     |                     |                     |                     |                     |                     |                    |
| Firm Obligations Control                                     |                     |                     |                     |                     |                     |                     |                     |                       |                     |                     |                     |                     |                     |                     |                     |                     |                     |                    |
| Worker Obligations and Firm Obligations Control              |                     |                     |                     |                     |                     |                     |                     |                       |                     |                     |                     |                     |                     |                     |                     |                     |                     |                    |
| Outcome: Worker Rights, Firm Obligations                     |                     |                     |                     |                     |                     |                     |                     |                       |                     |                     |                     |                     |                     |                     |                     |                     |                     |                    |
| Outcome: Worker Rights, Worker Obligations, Firm Obligations |                     |                     |                     |                     |                     |                     |                     |                       |                     |                     |                     |                     |                     |                     |                     |                     |                     |                    |
| Share Parsed Clauses Control                                 |                     |                     |                     |                     |                     |                     |                     |                       |                     |                     |                     |                     |                     |                     |                     |                     |                     |                    |
| Drop Zero-Worker Rights Contracts                            |                     |                     |                     |                     |                     |                     |                     |                       |                     |                     |                     |                     |                     |                     |                     |                     |                     |                    |
| Drop Ontario                                                 |                     |                     |                     |                     |                     |                     |                     |                       |                     |                     |                     |                     |                     |                     |                     |                     |                     |                    |
| Weighted by Wage Equivalence                                 |                     |                     |                     |                     |                     |                     |                     |                       |                     |                     |                     |                     |                     |                     |                     |                     |                     |                    |
| Weighted by Topic Importance                                 |                     |                     |                     |                     |                     |                     |                     |                       |                     |                     |                     |                     |                     |                     |                     |                     |                     |                    |

**Note:** Coefficients and standard errors of effect of labor tax rate on worker rights clauses, for different specifications as indicated in table footer. Outcome: Share of worker rights clauses, defined as number of worker rights clauses over the number of all clauses, unless noted otherwise. Treatment: Labor tax rate is defined as logarithmized implicit personal income tax rate. Controls: As indicated in row header; Pro-Union (Anti-Union) Law Controls includes a set of separate indicator variables for whether a given law favorable (unfavorable) to unions is in place, see Table 3 in Legree et al. (2017) for list of laws. Inference: Standard errors clustered at the province level, unless noted otherwise. Single, double, and triple asterisks indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards.

Table A.18: Robustness: Labor Income Tax Rate and Worker Rights Clauses Under Alternative Outcome Codings

|                        | Worker Rights Clauses |                     |                     |                     |                      |                     |                     |                     |
|------------------------|-----------------------|---------------------|---------------------|---------------------|----------------------|---------------------|---------------------|---------------------|
|                        | Share                 |                     |                     |                     | Number               |                     |                     |                     |
|                        | Share (Raw)           | Log Share           | Log Share + 1       | Asinh Share         | Number (Raw)         | Log Number          | Log Number + 1      | Asinh Number        |
|                        | (1)                   | (2)                 | (3)                 | (4)                 | (5)                  | (6)                 | (7)                 | (8)                 |
| Log Income Tax Rate    | 0.061***<br>(0.015)   | 1.292***<br>(0.269) | 0.058***<br>(0.014) | 0.060***<br>(0.015) | 44.237***<br>(5.538) | 1.778***<br>(0.183) | 2.569***<br>(0.372) | 2.972***<br>(0.463) |
| R-Squared              | 0.15                  | 0.12                | 0.15                | 0.15                | 0.22                 | 0.18                | 0.18                | 0.18                |
| Number of Observations | 24,826                | 23,043              | 24,826              | 24,826              | 24,826               | 23,043              | 24,826              | 24,826              |
| Province-Sector FEs    | X                     | X                   | X                   | X                   | X                    | X                   | X                   | X                   |
| Sector-Year FEs        | X                     | X                   | X                   | X                   | X                    | X                   | X                   | X                   |

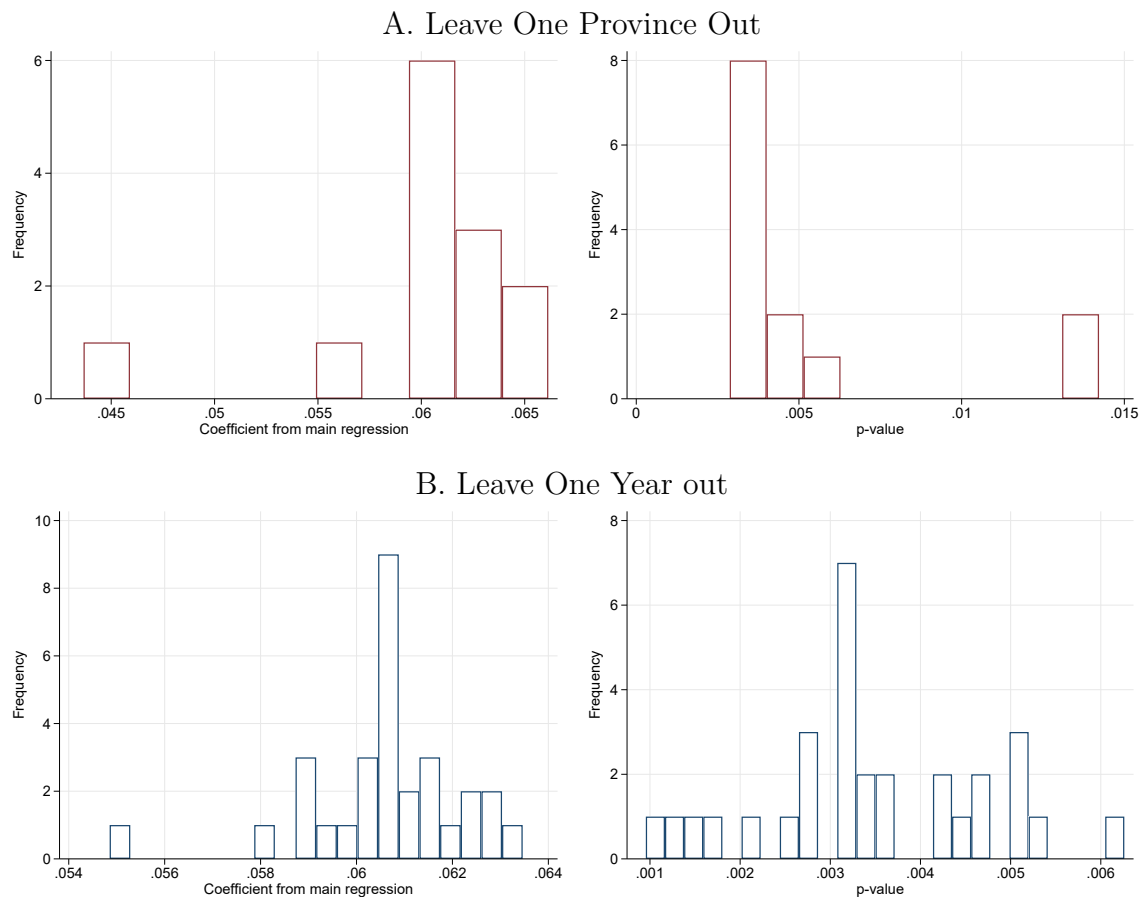
**Note:** Coefficients and standard errors of effect of labor tax rate on worker rights clauses, for different outcome codings as indicated in column header. Treatment: Labor tax rate is defined as logarithmized implicit personal income tax rate. Inference: Standard errors clustered at the province level. Single, double, and triple asterisks indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards.

Table A.19: Robustness: Effect of Labor Income Tax Rate on Alternative Outcomes

|                        | Firm Characteristics: |                  |                   |                   |                       |                   |  |
|------------------------|-----------------------|------------------|-------------------|-------------------|-----------------------|-------------------|--|
|                        | COLA Clause           | Firm Entry       | Firm Exit         | Private Firm      | Firm Size             | Log Firm Size     |  |
|                        | (1)                   | (2)              | (3)               | (4)               | (5)                   | (6)               |  |
| Log Income Tax Rate    | -0.003<br>(0.108)     | 0.231<br>(0.135) | -0.157<br>(0.158) | -0.019<br>(0.045) | -178.428<br>(573.081) | -0.479<br>(0.288) |  |
| R-Squared              | 0.16                  | 0.17             | 0.09              | 0.84              | 0.09                  | 0.33              |  |
| Number of Observations | 24,826                | 22,864           | 22,864            | 24,826            | 24,826                | 23,465            |  |
| Province-Sector FEs    | X                     | X                | X                 | X                 | X                     | X                 |  |
| Sector-Year FEs        | X                     | X                | X                 | X                 | X                     | X                 |  |

**Note:** Coefficients and standard errors of effect of log tax rate on firm characteristics indicated in the column header. COLA clause, firm entry, firm exit, and private firm are indicator variables. Sample of firm entries and firm exits excludes firms that only appear once in the dataset. Treatment: Labor tax rate is defined as logarithmized implicit personal income tax rate. Inference: Standard errors clustered at the province level. Single, double, and triple asterisks indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards.

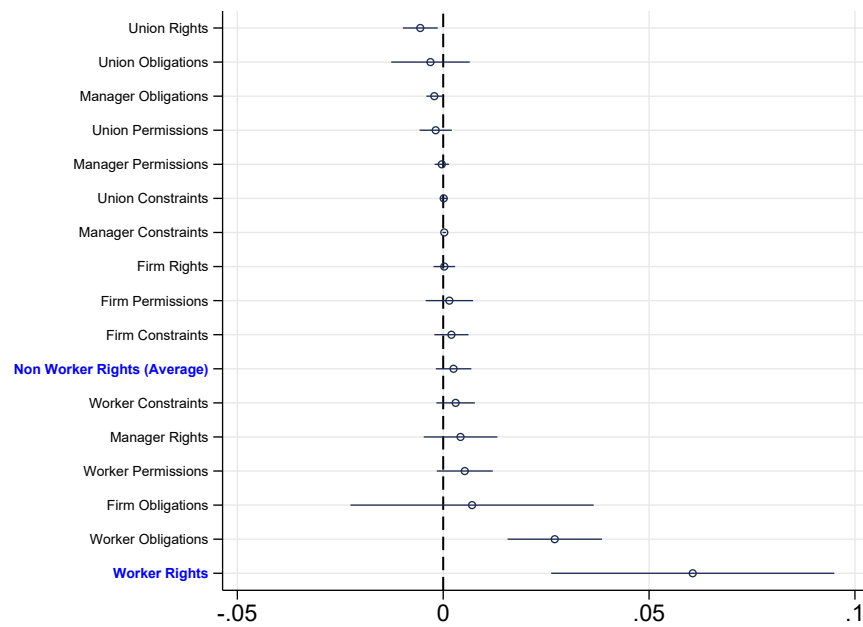
Figure A.12: Robustness: Labor Income Tax Rate and Worker Rights Clauses (Leave-one-out)



**Note:** Figures present coefficients and p-values of effect of log labor tax rate on worker rights clauses, dropping each province or year individually. Controls: Province-by-sector fixed effects and year-by-sector fixed effects. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards, Statistics Canada.



Figure A.13: Effect of Labor Income Tax Rate on Contract Terms



**Note:** Figure presents coefficients and 95% confidence intervals of the effect of labor tax rate on contract clause types. Each coefficient is from a separate OLS regression. Outcome: Clause type share (number of clauses of type in question over the number of all clauses). Treatment: Labor tax rate, defined as logarithmized implicit personal income tax rate. Controls: Province-by-sector fixed effects and year-by-sector fixed effects. Inference: Standard errors clustered at the province level. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards.

Figure A.14: Effect of Labor Income Tax Rate on Worker Rights Clauses: Pre-Trend Sensitivity Analysis

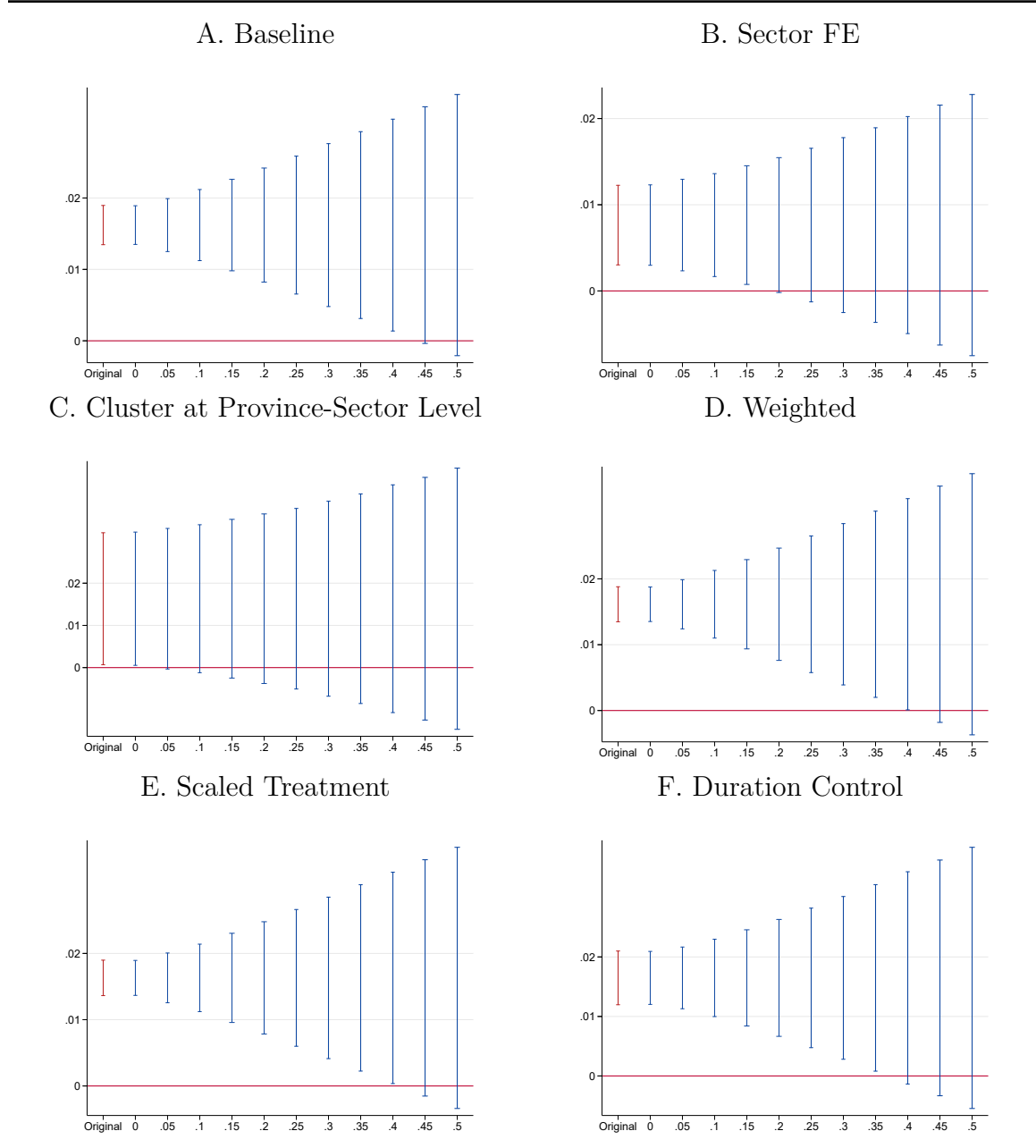
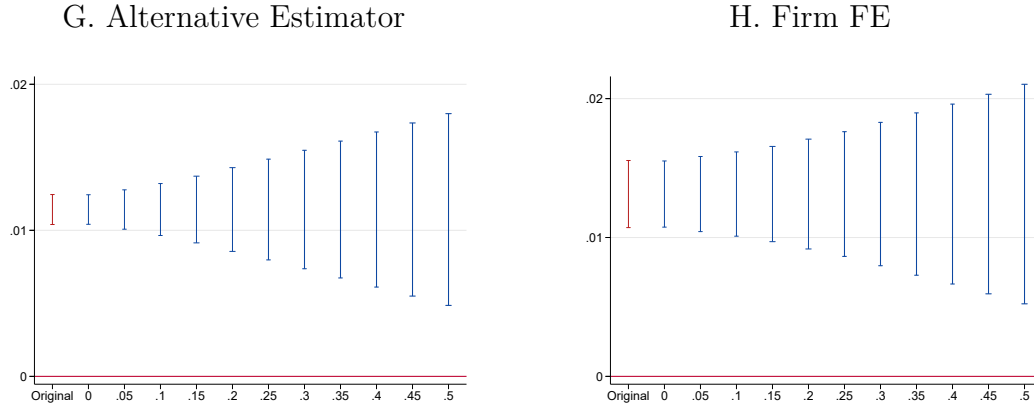


Figure A.14 (cont.): Effect of Labor Income Tax Rate on Worker Rights Clauses:  
Pre-Trend Sensitivity Analysis



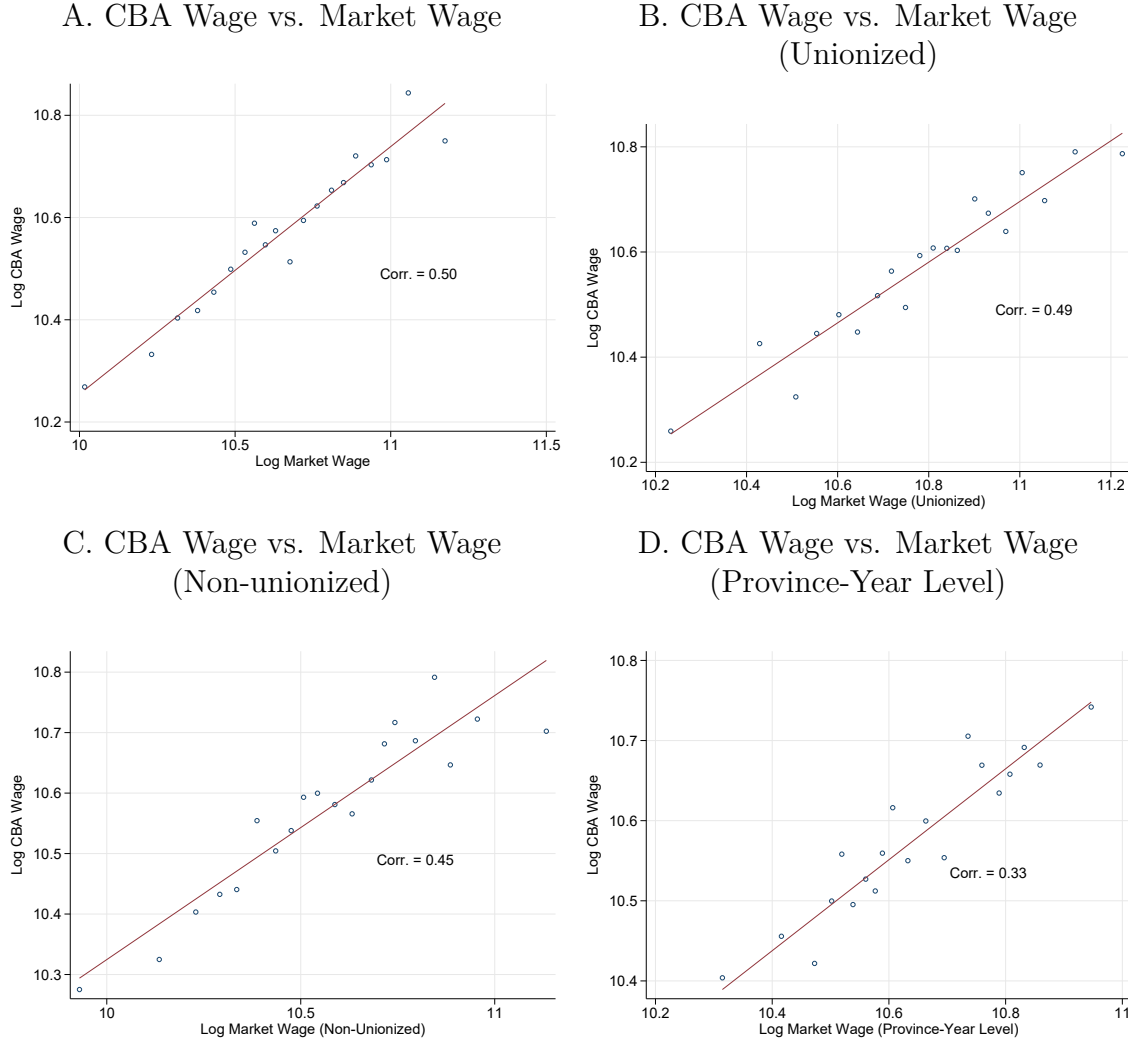
**Note:** Figure reports sensitivity intervals for potential violations of parallel trends using the method of Rambachan and Roth (2023). The outcome is the share of worker-right clauses. Red bars show the 90% confidence interval for the average post-reform event-study effect in Figure 4 (Callaway and Sant'Anna, 2021). Blue bars allow post-treatment trend nonlinearity up to  $M$  times the maximum pre-treatment nonlinearity;  $M = 0$  permits a linear differential trend. Panels A--H show the baseline, sector fixed effects, province-sector clustering, event-size weights, scaled treatment, with contract duration control, the alternative TWFE estimator of Cengiz et al. (2019), and that estimator with firm fixed effects, respectively. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards.

Table A.20: Robustness: Effect of Statutory, Marginal, and CBA Labor Income Tax Rate on Worker Rights

|                                              | Worker Rights Clauses     |                            |                                                 |                           |                         |                                                 |                          |                            |                                                 |
|----------------------------------------------|---------------------------|----------------------------|-------------------------------------------------|---------------------------|-------------------------|-------------------------------------------------|--------------------------|----------------------------|-------------------------------------------------|
|                                              | Statutory Tax             |                            |                                                 | Marginal Tax              |                         |                                                 | CBA Tax                  |                            |                                                 |
|                                              | OLS                       | 2SLS<br>(Lag =<br>3 years) | 2SLS<br>(Average of<br>Lags = 1,<br>2, 3 years) | OLS                       | 2SLS<br>(Lag = 3 years) | 2SLS<br>(Average of<br>Lags = 1,<br>2, 3 years) | OLS                      | 2SLS<br>(Lag =<br>3 years) | 2SLS<br>(Average of<br>Lags = 1,<br>2, 3 years) |
| Log Tax Rate                                 | (1)<br>0.028**<br>(0.011) | (2)                        | (3)                                             | (4)<br>0.014**<br>(0.006) | (5)                     | (6)                                             | (7)<br>0.023*<br>(0.012) | (8)                        | (9)                                             |
| Instrumented Log Tax Rate                    |                           | 0.034*<br>(0.016)          | 0.027*<br>(0.013)                               |                           | 0.018*<br>(0.009)       | 0.013*<br>(0.006)                               |                          | 0.050**<br>(0.020)         | 0.043**<br>(0.018)                              |
| Kleibergen-Paap rk Wald F-Statistic          |                           | 36.86                      | 39.54                                           |                           | 203.43                  | 576.41                                          |                          | 19.43                      | 19.29                                           |
| R-Squared                                    | 0.15                      | 0.0007                     | 0.0007                                          | 0.15                      | 0.0003                  | 0.0004                                          | 0.15                     | -0.0003                    | 0.0003                                          |
| Number of Observations                       | 24,826                    | 24,826                     | 24,826                                          | 24,826                    | 24,826                  | 24,826                                          | 24,762                   | 24,762                     | 24,762                                          |
| Province-by-Sector and<br>Year-by-Sector FEs | X                         | X                          | X                                               | X                         | X                       | X                                               | X                        | X                          | X                                               |

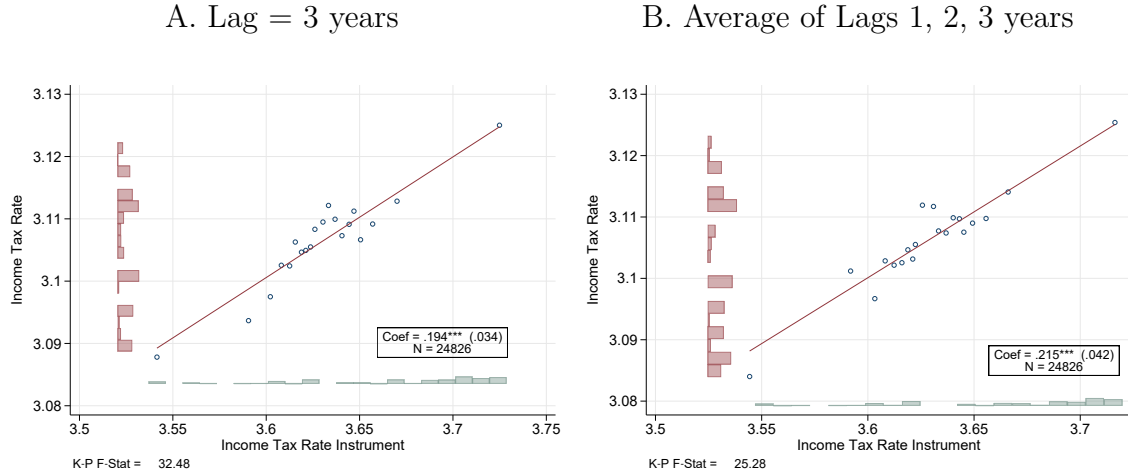
**Note:** Table presents the OLS and 2SLS coefficients of estimation of statutory, marginal, and CBA labor income tax rate on worker rights. Outcome: Share of worker rights clauses (number of worker rights over the number of all clauses). Statutory tax rate is labor income tax rate specified in Canadian tax legislation. Marginal tax rate is incremental tax liability associated with an additional \$100 of income, evaluated at the province-year income distribution. CBA tax rate is imputed using the average CBA tax rate calculated based on wage tables in contracts at the province-year-sector level. Treatment for Columns 1, 4, and 7: Log Labor tax rate in province  $p$  and year  $t$ . Treatment for Columns 2, 3, 5, 6, 8, and 9: Log Labor tax rate in province  $p$  and year  $t$ , instrumented as the log of the sum of marginal federal income tax rate of year  $t$ , calculated for an additional \$100 of federal income of province  $p$  and year  $t-k$ , and the marginal province income tax rate of province  $p$  and year  $t-k$ , calculated for an additional \$100 income of province  $p$  and year  $t-k$ , for  $k=1, 2, 3$ . Controls: Province-by-sector fixed effects and year-by-sector fixed effects. Inference: Standard errors clustered at the province level. Single, double, and triple asterisks indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards, Statistics Canada.

Figure A.15: CBA Wage and Market Wage



**Note:** Panel A: Binscatter plot of log market wages based on individual LFS wage data of both unionized and non-unionized workers' log annual wages (before taxes and other deductions, but including tips, commission and bonuses) aggregated to the province-occupation-year level (horizontal axis) and log annual CBA wages based on LLM OCRs (vertical axis). Panel B: Binscatter plot of log market wages based on individual LFS wage data of unionized worker's log annual wages (before taxes and other deductions, but including tips, commission and bonuses) aggregated to the province-occupation-year level (horizontal axis) and log annual CBA wages based on LLM OCRs (vertical axis). Panel C: Binscatter plot of log market wages based on individual LFS wage data of non-unionized worker's log annual wages (before taxes and other deductions, but including tips, commission and bonuses) aggregated to the province-occupation-year level (horizontal axis) and log annual CBA wages based on LLM OCRs (vertical axis). Panel D: Binscatter plot of log market wages based on individual LFS wage data of both unionized and non-unionized workers' log annual wages (before taxes and other deductions, but including tips, commission and bonuses) aggregated to the province-year level (horizontal axis) and log annual CBA wages based on LLM OCRs (vertical axis). Data sources: Employment and Social Development Canada, Center for the Study of Living Standards, Canadian Labour Force Survey.

Figure A.16: Labor Income Tax Rate IV: First Stages



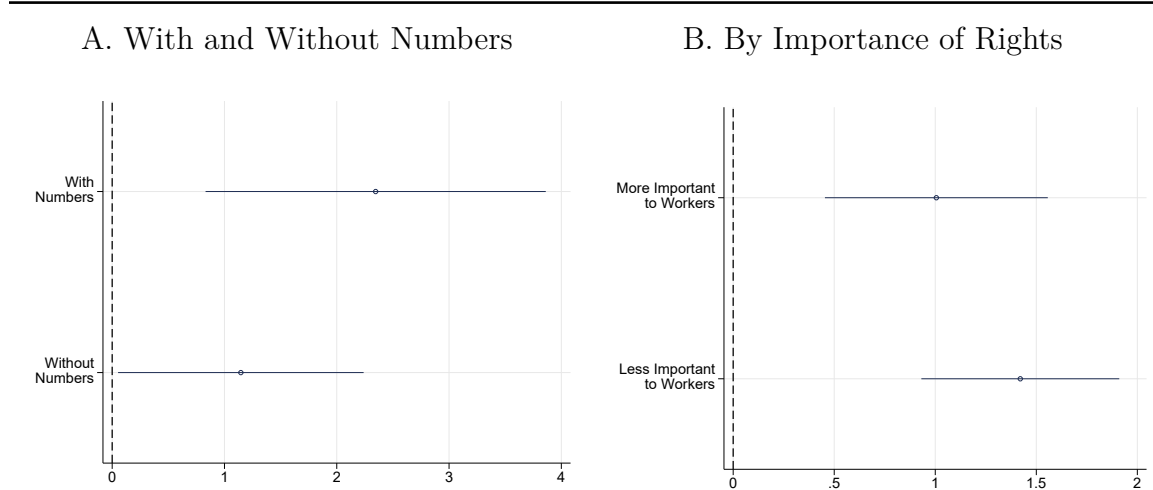
**Note:** Figures present first stage binscatters of labour income tax rate (vertical axis) and predicted income tax rate based on lagged rates and exemptions (horizontal axis). Controls: Province-by-sector fixed effects and year-by-sector fixed effects. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards, Statistics Canada.

Table A.21: Effect of Tax Rate on Strike Intensity

|                        | <u>Intensity</u> |                   |                   |                  |                    |
|------------------------|------------------|-------------------|-------------------|------------------|--------------------|
|                        | (1)              | (2)               | (3)               | (4)              | (5)                |
| Log Income Tax Rate    | 0.524<br>(0.339) | 1.076*<br>(0.588) | 1.033*<br>(0.594) | 0.896<br>(0.781) | 1.445**<br>(0.699) |
| R-Squared              | 0.07             | 0.08              | 0.09              | 0.33             | 0.14               |
| Number of Observations | 24,826           | 11,405            | 11,340            | 9,750            | 4,468              |
| Sample                 | All              | Private           | Private           | Private          | Private            |
| Province-Sector FEs    | X                | X                 | X                 | X                | X                  |
| Sector-Year FEs        | X                | X                 | X                 | X                | X                  |
| Firm Controls          |                  |                   | X                 |                  |                    |
| Firm FE                |                  |                   |                   | X                |                    |
| Union FE               |                  |                   |                   |                  | X                  |

**Note:** Coefficients and standard errors of effect of labor tax rate on strike intensity, for different specifications as indicated in table footer. Outcome: Strike intensity, defined as square root of number of working days lost to a strike during this contract negotiation. Treatment: Labor tax rate is defined as log of implicit personal income tax rate. Inference: Standard errors clustered at the province level. Single, double, and triple asterisks indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards, Canadian Labour Force Survey.

Figure A.17: Effect of Tax Rates on Worker Rights Clauses, by Heterogeneous Rights



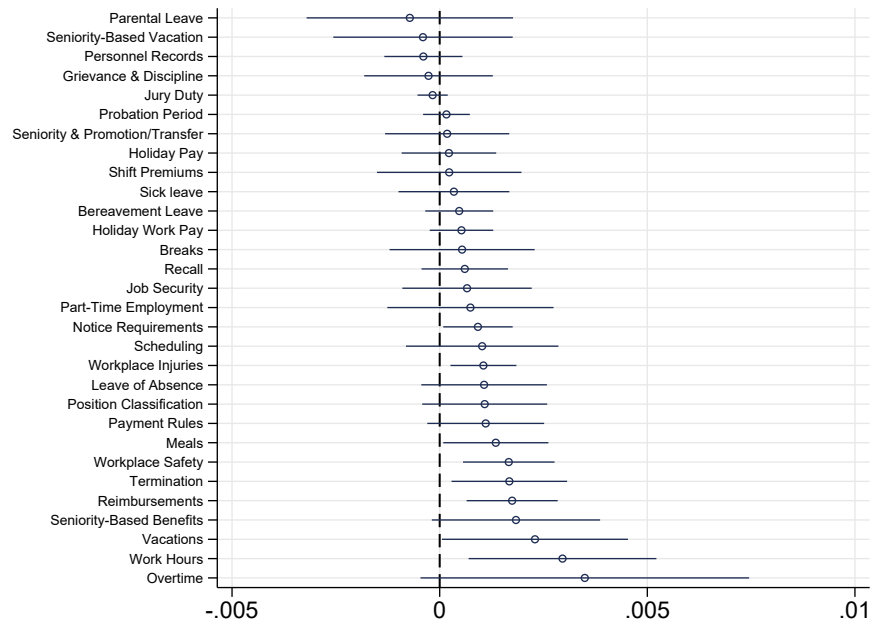
**Note:** Figure presents coefficients and 95% confidence intervals of the effect of log labor tax rate on different worker-right topical categories. Outcome: Worker right topic, defined as standardized mean of 15 applicable topics, each defined as share of worker rights clauses that belong to given topic (number of clauses of topic in question over the number of all clauses). Panel A constructs the measure separately using clauses that contain numerical provisions and clauses that do not. Panel B constructs the measure separately for more- and less-important topics. Topic importance is ranked by drawing 10 clauses from each of the 30 topics and forming all 4,350 cross-topic clause pairs in total, asking GPT-4.1-mini to identify which clause concerns a more important issue, and aggregating the pairwise comparisons into topic-level odds ratios. Treatment: Labor tax rate, defined as log of implicit personal income tax rate. Controls: Province-by-sector fixed effects and year-by-sector fixed effects. Inference: Standard errors clustered at the province level. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards.

Table A.22: Labor Income Tax Rate and Worker Rights Clauses over Subperiods

|                                           | Worker Rights Clauses |                    |                   |
|-------------------------------------------|-----------------------|--------------------|-------------------|
|                                           | (1)                   | (2)                | (3)               |
|                                           | 1986-1995             | 1996-2005          | 2006-2015         |
| Log Income Tax Rate                       | 0.045***<br>(0.016)   | 0.041**<br>(0.017) | 0.069*<br>(0.037) |
| R-Squared                                 | 0.12                  | 0.14               | 0.17              |
| Number of Observations                    | 9,742                 | 11,416             | 3,638             |
| Province-by-Sector and Year-by-Sector FEs | X                     | X                  | X                 |

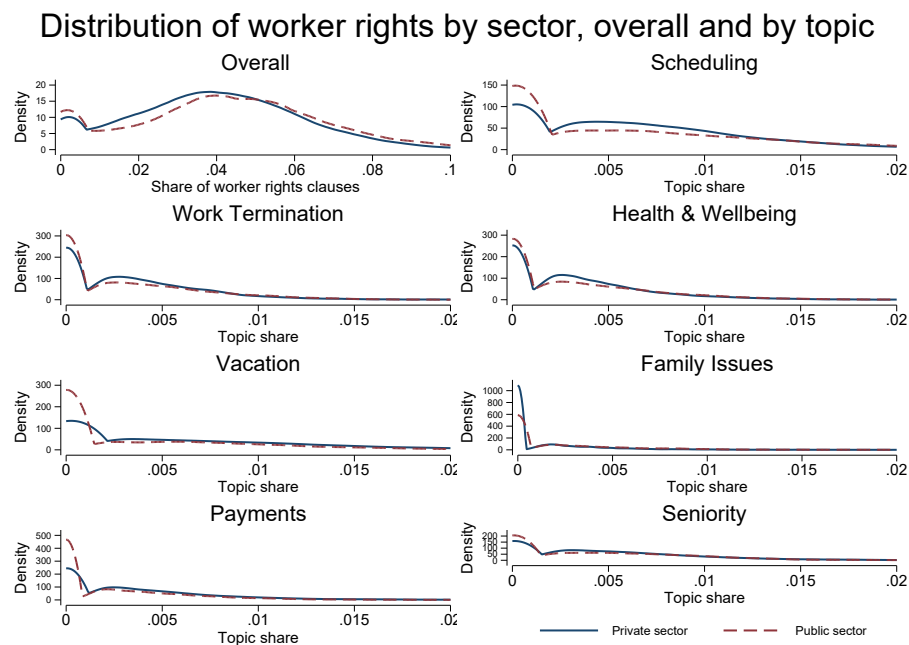
**Note:** Coefficients and standard errors of effect of labor tax rate on worker rights clauses, for different subperiods as indicated in table header. Outcome: Share of worker rights clauses, defined as number of worker rights clauses over the number of all clauses. Treatment: Labor tax rate is defined as logarithmized implicit personal income tax rate. Inference: Standard errors clustered at the province level. Single, double, and triple asterisks indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards.

Figure A.18: Effect of Labor Income Tax Rates on Worker Rights Clauses by Topic  
– 30 Topics



**Note:** Figure presents coefficients and 95% confidence intervals of the effect of labor tax rate on worker rights topics. Each coefficient is from a separate OLS regression. Outcome: Share of worker rights clauses that belong to given topic (number of worker rights clauses of topic in question over the number of all clauses). Treatment: Labor tax rate, defined as log of implicit personal income tax rate. Controls: Province-by-sector fixed effects and year-by-sector fixed effects. Inference: Standard errors clustered at the province level. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards.

Figure A.19: Distribution of Worker Rights Clauses, by Sector and Category

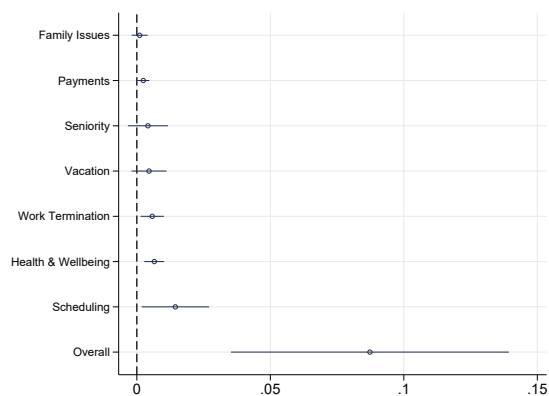


**Note:** Figure presents kernel density estimates of the distribution of worker rights in public sector (red dashed line) and private sector (blue solid line). Worker rights are defined as share of worker rights clauses overall and by topic group (number of worker rights clauses of topic group in question over the number of all clauses). Top left subfigure shows the distribution of the overall share of worker rights clauses; subsequent subfigures show distributions separately by topical group, with topics constructed using clustered sentence embeddings as described in Section 3.4. Each density is estimated separately by sector and category using an Epanechnikov kernel and optimal bandwidth choice (minimizing mean integrated squared error). Data source: Employment and Social Development Canada.

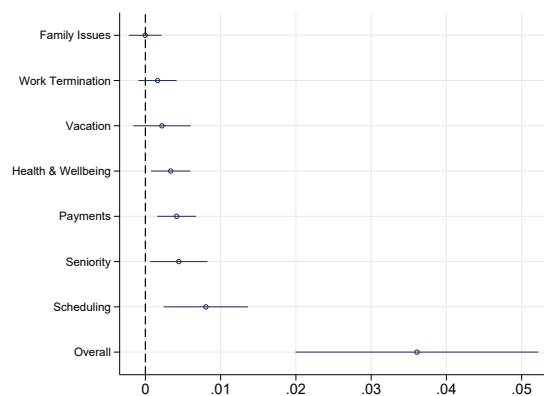


Figure A.20: Effect of Tax Rate on Worker Rights Clauses, by Sector and Category

A. Effect of Tax Rate, Public Sector

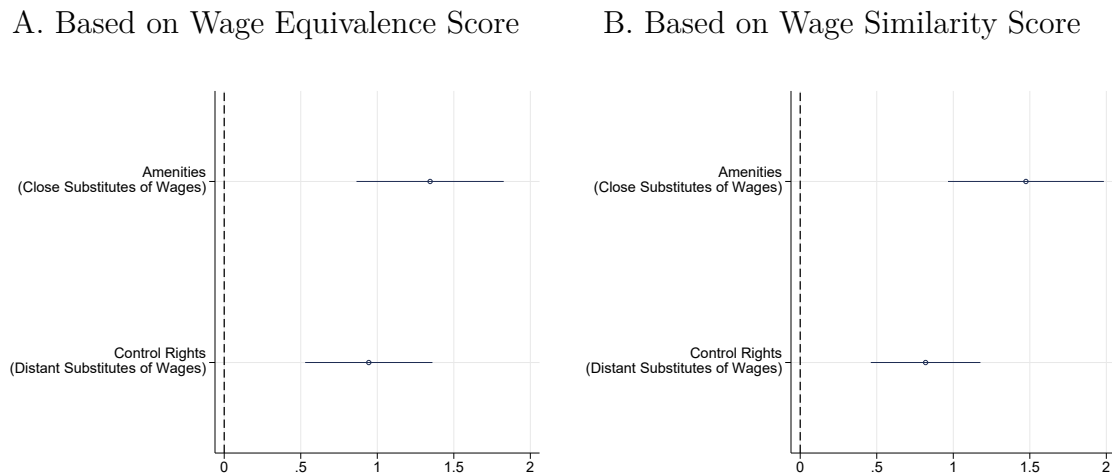


B. Effect of Tax Rate, Private Sector



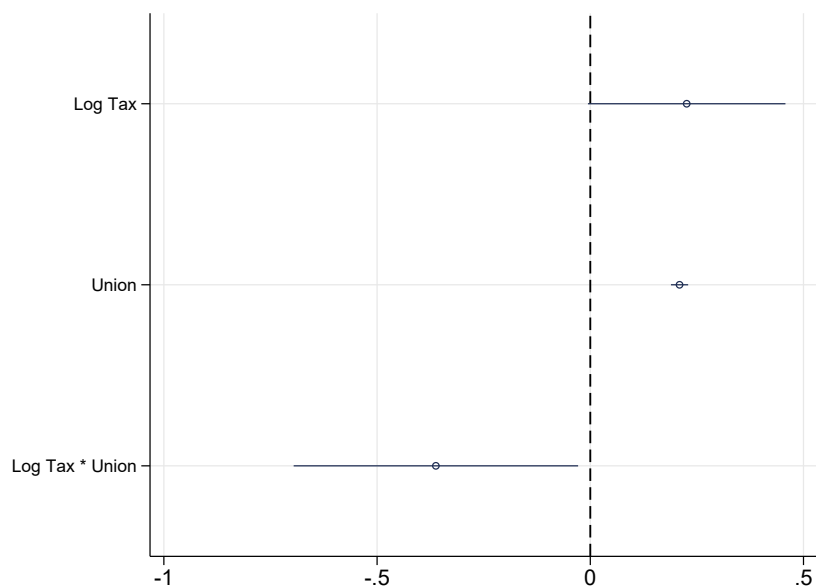
**Note:** Figures present coefficients and 95% confidence intervals of the effect of labor tax rate in public sector only (Panel A) and in private sector only (Panel B) on worker rights overall and separately by category, with the categories built using clustered sentence embeddings as described in Section 3.4. Each coefficient is from a separate OLS regression. Outcome: Share of worker rights clauses overall and by topic group (number of worker rights clauses of topic group in question over the number of all clauses). Treatment: Labor tax rate, defined as log implicit personal income tax rate. Controls: Province-by-sector fixed effects and year-by-sector fixed effects. Inference: Standard errors clustered at the province level. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards.

Figure A.21: Effect of Tax Rates on Worker Rights Clauses, by Substitutability with Wages



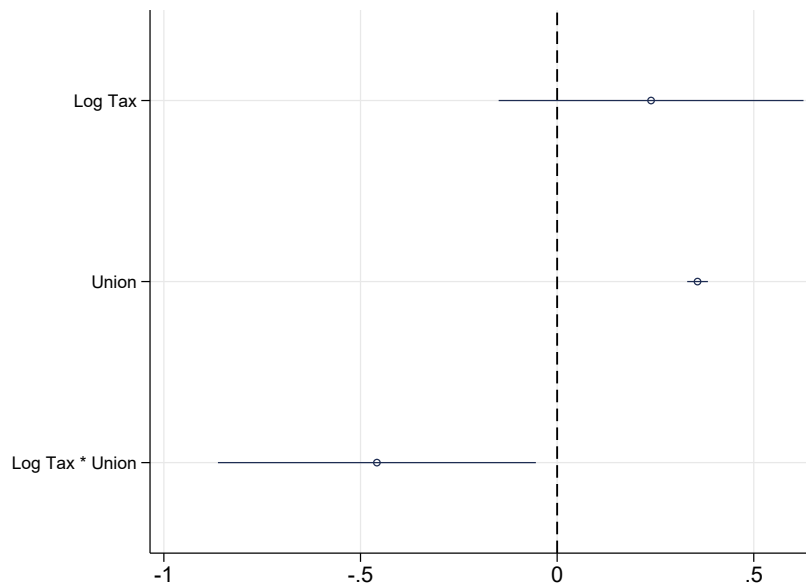
**Note:** Figure presents coefficients and 95% confidence intervals of the effect of log labor tax rate on worker-right topical categories (by substitutability with wages). Wage equivalence score of a given topic is calculated by averaging predicted clause-level wage substitutability scores within the topic, where scores are generated by a supervised model mapping pretrained MPNet embeddings to a 0-10 scale trained on 2,000 randomly sampled clauses labeled using GPT-4.1-mini and 100 human-annotated clauses. The wage-similarity score for a topic is the average cosine similarity between the topic-centroid vector and the vectors for the following 20 wage-like statements: "Employees shall have ..." incentive-based pay. a commission. a production bonus. a piece rate. a cost-of-living allowance. hazard pay. a uniform allowance. a tool allowance. free room and board. subsidized room and board. paid vacation leave. paid holiday leave. paid sick leave. paid personal leave. overtime pay. shift differential pay. life insurance. health insurance. disability insurance. retirement benefits. The 15 topics with highest (lowest) values of corresponding score are grouped in categories of close (distant) substitutes of wages. Each coefficient is from a separate OLS regression. Outcome: Worker right topic, defined as standardized mean of 15 applicable topics, each defined as share of worker rights clauses that belong to given topic (number of clauses of topic in question over the number of all clauses). Treatment: Labor tax rate, defined as log of implicit personal income tax rate. Controls: Province-by-sector fixed effects and year-by-sector fixed effects. Inference: Standard errors clustered at the province level. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards.

Figure A.22: Effect of Labor Income Tax Rates and Union Status on Wages



**Note:** Figure presents coefficients and 95% confidence intervals of the effect of labor tax rate, union status, and the interaction of labor tax rate and union status on individual wages. All coefficients are from the same OLS regression. Outcome: Individual wages, defined as worker's logarithmized hourly wage (before taxes and other deductions, but including tips, commission and bonuses). Treatments: Labor tax rate, defined as logarithmized implicit personal income tax rate; union status, defined as an indicator variable that equals one if worker is a member of a union, and zero otherwise. Controls: Province-by-sector fixed effects, and year-by-sector fixed effects. Inference: Standard errors clustered at the province level. Sample: 1999-2006 (excludes years from the financial crisis 2007 onward). Data sources: Canadian Labour Force Survey, Center for the Study of Living Standards.

Figure A.23: Effect of Labor Income Tax Rates and Union Status on Wages, adding Gallup data



**Note:** Figure presents coefficients and 95% confidence intervals of the effect of labor tax rate, union status, and the interaction of labor tax rate and union status on individual wages. All coefficients are from the same OLS regression. Sample: Merge of Gallup (1986-1996) and Canadian Labour Force Survey (1997-2006). Outcome: Individual wages, defined as worker's logarithmized hourly wage (before taxes and other deductions, but including tips, commission and bonuses). For Gallup, outcome is calculated from harmonized annual income levels (assuming 52 weeks per year and 36 working hours per week). Treatments: Labor tax rate, defined as logarithmized implicit personal income tax rate; union status, defined as an indicator variable that equals one if worker is a member of a union, and zero otherwise. Controls: Province fixed effects, and year fixed effects. Note that we do not have sector information for Gallup and therefore cannot interact province and year fixed effects with sector (not interacting these fixed effects allows us to add data from the Canadian Labour Force Survey for 1997 and 1998, for which we also do not have sector information). Inference: Standard errors clustered at the province level. Data sources: Canadian Labour Force Survey, Gallup, Center for the Study of Living Standards.

## B Appendix: Effects of Outside Options on Worker Rights

This appendix compiles empirical results that focus on effects of outside options on worker rights. Sectoral employment is a coarse proxy for worker outside options. Because the OLS estimates may also capture shocks that affect both employment and firm productivity or revenues, we interpret these results as suggestive and retain them in the appendix. In particular, we look at the local sectoral employment rate at the time of contract negotiation, which varies at the province by sector by year level. We calculate it as a leave-one-out employment rate, in which the employment rate in a given province, year, and sector is replaced by the average of the log employment rates in that province and year in all other sectors, noted as  $z_{pst}^{emp} = \frac{\sum_{i \neq s, i \in S_{pt}} \log(\text{employment}_{pit}/\text{pop}_{pt})}{|S_{pt}|-1}$ , where  $S_{pt}$  is the set of sectors in a province-year. Due to substantial cross-sector mobility of workers in Canada (Chen and Fougère, 2010), this leave-one-out employment rate variable serves as a proxy for the outside option of workers during the bargaining process (Beaudry et al., 2012; Green et al., 2026). We use a continuous measure for panel regressions, and a discretized version for event study regressions.

Table B.1 displays OLS results from Equation 1, which are otherwise comparable to Table 5. Throughout the specifications, a higher employment rate raises measured worker rights, while leaving non-worker rights unchanged. Appendix Table B.2 shows that the estimate for worker rights is robust to a range of alternative specifications including province-specific time trends, firm fixed effects, or a set of variables encoding pro- and anti-union state laws. Appendix Figure B.3 reports leave-one-out exercises that drop each province and year individually and the results remain largely unchanged.

The effect also holds in more flexible event-study specifications analyzing discrete employment increases (Callaway and Sant’Anna, 2021), as displayed in Figure B.4. There is no significant trend in worker rights for pre-event periods, and an increase in rights after the event. The result remains robust to allowing for substantial nonlinear deviations from parallel trends (Rambachan and Roth, 2023), see Appendix Figure B.5. Further exhibits analogous to the tax analysis are shown in the following. In sum, the rise in worker rights following an employment increase is consistent with shifts in relative bargaining power between workers and employers.

Table B.1: Effect of Employment Rate on (Non-)Worker Rights Clauses

|                                           | Worker Rights<br>Clauses |                   |                   | Non-Worker Rights<br>Clauses (Average) |                  |                     |
|-------------------------------------------|--------------------------|-------------------|-------------------|----------------------------------------|------------------|---------------------|
|                                           | (1)                      | (2)               | (3)               | (4)                                    | (5)              | (6)                 |
| Log Employment Rate                       | 0.048*<br>(0.024)        | 0.053*<br>(0.024) | 0.047*<br>(0.024) | 0.002<br>(0.003)                       | 0.001<br>(0.003) | -0.00001<br>(0.002) |
| R-Squared                                 | 0.10                     | 0.15              | 0.17              | 0.13                                   | 0.20             | 0.23                |
| Number of Observations                    | 29,194                   | 29,157            | 27,792            | 29,194                                 | 29,157           | 27,792              |
| Province, Year, and Sector FEs            | X                        |                   |                   | X                                      |                  |                     |
| Province-by-Sector and Year-by-Sector FEs |                          | X                 | X                 |                                        | X                | X                   |
| Firm/Contract Controls                    |                          |                   | X                 |                                        |                  | X                   |

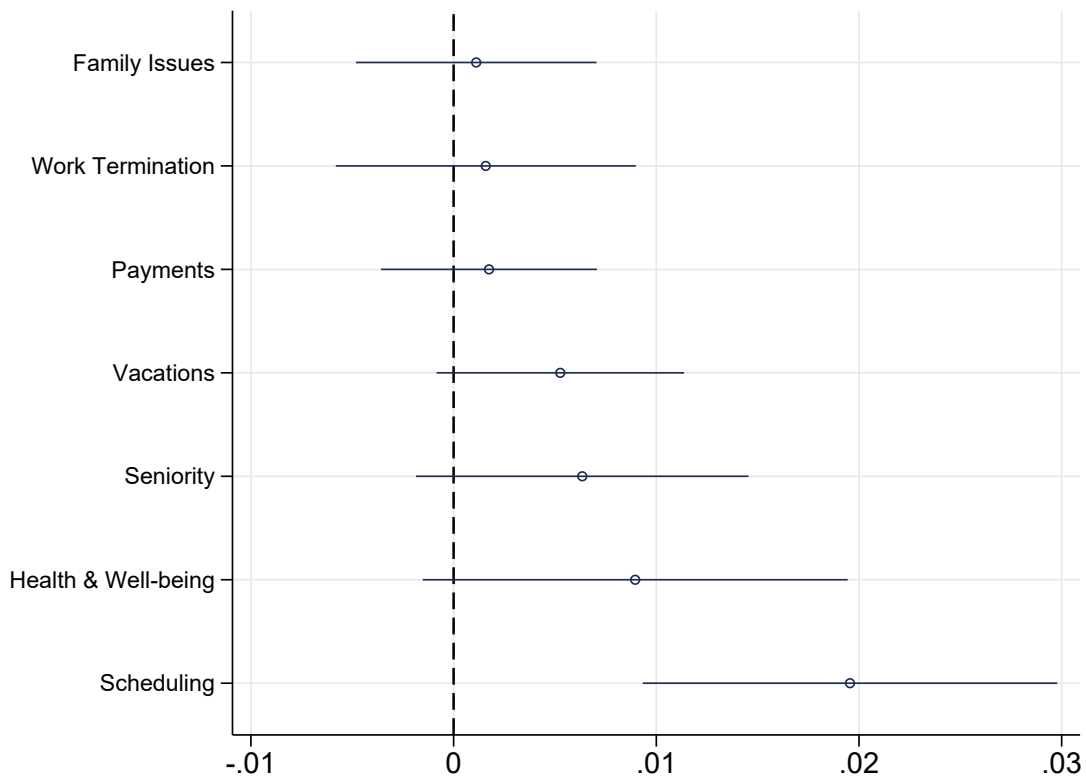
**Note:** Coefficients and standard errors of effect of leave-one-out employment rate on worker rights clauses and other parsed provisions, for different specifications as indicated in table footer. Outcome for Columns 1-3: Share of worker rights clauses, defined as number of worker rights clauses over the number of all clauses. Outcome for Columns 4-6: Averaged share of other parsed clauses besides worker rights (e.g. firm obligations, worker obligations, etc) over the total number of all clauses. Treatment: leave-one-out employment rate in a given sector, defined as the logarithmized average over the employment rates in other sectors. Inference: Standard errors clustered at the province level. Firm/Contract controls: Logarithm of firm size, logarithm of contract duration, logarithm of contract length, has COLA clause (indicator), and private firm (indicator). Single, double, and triple asterisks indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Data sources: Employment and Social Development Canada, Canadian Labour Force Survey.

Table B.2: Robustness: Effect of Employment Rate on Worker Rights Clauses

|                                                              | Worker Rights Clauses |                   |                    |                    |                   |                     |                     |                   |                   |                   |                   |                   |                   |                     |                     |                     |                     |                     |
|--------------------------------------------------------------|-----------------------|-------------------|--------------------|--------------------|-------------------|---------------------|---------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|                                                              | (1)                   | (2)               | (3)                | (4)                | (5)               | (6)                 | (7)                 | (8)               | (9)               | (10)              | (11)              | (12)              | (13)              | (14)                | (15)                | (16)                | (17)                | (18)                |
| Log Emp. Rate                                                | 0.053*<br>(0.024)     | 0.050*<br>(0.025) | 0.040**<br>(0.018) | 0.055**<br>(0.021) | 0.053*<br>(0.021) | 0.078***<br>(0.021) | 0.056***<br>(0.015) | 0.050*<br>(0.022) | 0.049*<br>(0.023) | 0.050*<br>(0.023) | 0.037*<br>(0.018) | 0.073*<br>(0.036) | 0.101*<br>(0.051) | 0.035***<br>(0.013) | 0.052***<br>(0.014) | 0.034***<br>(0.014) | 0.062***<br>(0.014) | 0.041***<br>(0.011) |
| R-Squared                                                    | 0.15                  | 0.16              | 0.56               | 0.36               | 0.15              | 0.15                | 0.15                | 0.15              | 0.15              | 0.17              | 0.31              | 0.17              | 0.18              | 0.47                | 0.16                | 0.17                | 0.17                | 0.18                |
| Number of Observations                                       | 29,157                | 29,157            | 26,669             | 13,735             | 29,157            | 27,003              | 27,003              | 29,157            | 29,157            | 29,157            | 29,157            | 29,157            | 29,157            | 29,157              | 27,108              | 13,498              | 24,899              | 24,899              |
| Province-Sector FEs                                          | X                     | X                 | X                  | X                  | X                 | X                   | X                   | X                 | X                 | X                 | X                 | X                 | X                 | X                   | X                   | X                   | X                   | X                   |
| Sector-Year FEs                                              | X                     | X                 | X                  | X                  | X                 | X                   | X                   | X                 | X                 | X                 | X                 | X                 | X                 | X                   | X                   | X                   | X                   | X                   |
| Province Trends                                              |                       |                   |                    |                    |                   |                     |                     |                   |                   |                   |                   |                   |                   |                     |                     |                     |                     |                     |
| Firm Fixed Effects                                           |                       |                   | X                  |                    |                   |                     |                     |                   |                   |                   |                   |                   |                   |                     |                     |                     |                     |                     |
| Union Fixed Effects                                          |                       |                   |                    |                    |                   |                     |                     |                   |                   |                   |                   |                   |                   |                     |                     |                     |                     |                     |
| Cluster by Province-Sector                                   |                       |                   |                    |                    | X                 |                     |                     |                   |                   |                   |                   |                   |                   |                     |                     |                     |                     |                     |
| Pro-Union Law Controls                                       |                       |                   |                    |                    |                   | X                   |                     |                   |                   |                   |                   |                   |                   |                     |                     |                     |                     |                     |
| Anti-Union Law Controls                                      |                       |                   |                    |                    |                   |                     | X                   |                   |                   |                   |                   |                   |                   |                     |                     |                     |                     |                     |
| NDP Party Control                                            |                       |                   |                    |                    |                   |                     |                     | X                 |                   |                   |                   |                   |                   |                     |                     |                     |                     |                     |
| Employment Control                                           |                       |                   |                    |                    |                   |                     |                     |                   | X                 |                   |                   |                   |                   |                     |                     |                     |                     |                     |
| Firm Obligations Control                                     |                       |                   |                    |                    |                   |                     |                     |                   |                   | X                 |                   |                   |                   |                     |                     |                     |                     |                     |
| Worker Obligations and Firm Obligations Control              |                       |                   |                    |                    |                   |                     |                     |                   |                   |                   | X                 |                   |                   |                     |                     |                     |                     |                     |
| Outcome: Worker Rights, Firm Obligations                     |                       |                   |                    |                    |                   |                     |                     |                   |                   |                   |                   | X                 |                   |                     |                     |                     |                     |                     |
| Outcome: Worker Rights, Worker Obligations, Firm Obligations |                       |                   |                    |                    |                   |                     |                     |                   |                   |                   |                   |                   | X                 |                     |                     |                     |                     |                     |
| Share Parsed Clauses Control                                 |                       |                   |                    |                    |                   |                     |                     |                   |                   |                   |                   |                   |                   | X                   |                     |                     |                     |                     |
| Drop Zero-Worker Rights Contracts                            |                       |                   |                    |                    |                   |                     |                     |                   |                   |                   |                   |                   |                   |                     | X                   |                     |                     |                     |
| Drop Ontario                                                 |                       |                   |                    |                    |                   |                     |                     |                   |                   |                   |                   |                   |                   |                     |                     |                     | X                   |                     |
| Weighted by Wage Equivalence                                 |                       |                   |                    |                    |                   |                     |                     |                   |                   |                   |                   |                   |                   |                     |                     |                     | X                   | X                   |
| Weighted by Topic Importance                                 |                       |                   |                    |                    |                   |                     |                     |                   |                   |                   |                   |                   |                   |                     |                     |                     |                     | X                   |

**Note:** Coefficients and standard errors of effect of leave-one-out employment rate on worker rights clauses, for different specifications as indicated in table footer. Outcome: Share of worker rights clauses, defined as number of worker rights clauses over the number of all clauses, unless noted otherwise. Treatment: Leave-one-out employment rate in a given sector, defined as the logarithmized average over the employment rates in other sectors. Controls: Pro-Union (Anti-Union) Law Controls includes a set of separate indicator variables for whether a given law favorable (unfavorable) to unions is in place, see Table 3 in Legree et al. (2017) for list of laws. Employment control controls for log employment rate (own sector). Inference: Standard errors clustered at the province-by-sector level, unless noted otherwise. Single, double, and triple asterisks indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Data sources: Employment and Social Development Canada, Canadian Labour Force Survey.

Figure B.1: Effect of Employment Rate on Worker Rights Clauses, by Category



**Note:** This figure presents coefficients and 95% confidence intervals of the effect of the leave-one-out employment rate on worker rights separately by category, with the categories built using clustered sentence embeddings as described in Section 3.4. Each coefficient is from a separate OLS regression. Outcome: Share of worker rights clauses that belong to given topic group (number of worker rights clauses of topic group in question over the number of all clauses). Treatment: Leave-one-out employment rate in a given sector, defined as the average log employment over other sectors in the same province-year. Controls: Province-by-sector fixed effects and year-by-sector fixed effects. Inference: Standard errors clustered at the province level. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards, Canadian Labour Force Survey.

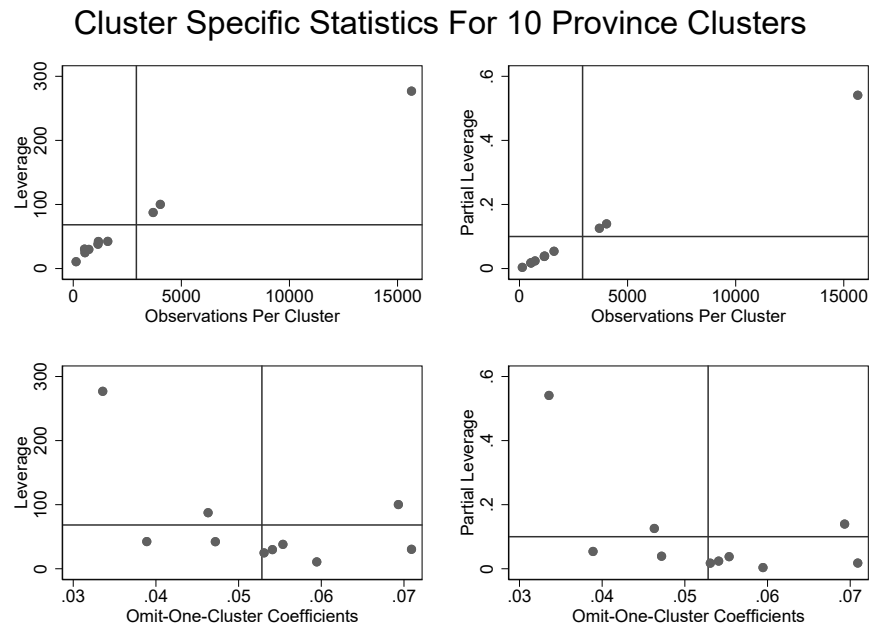
Table B.3: Effect of Employment Rate on Worker Rights Clauses: P-Values Under Alternative Cluster-Robust Inference Methods

|                                              | Inference method<br>(1)                | P-Value<br>(2) |
|----------------------------------------------|----------------------------------------|----------------|
| Panel A: Asymptotic cluster-robust inference |                                        |                |
|                                              | CV1 (cluster-robust)                   | 0.054          |
|                                              | CV3 (cluster jackknife)                | 0.152          |
|                                              | CV3j (cluster jackknife)               | 0.152          |
| Panel B: Wild cluster bootstrap inference    |                                        |                |
|                                              | CGM wild cluster bootstrap             | 0.107          |
|                                              | WCR-C (restricted, classic)            | 0.021          |
|                                              | WCU-C (unrestricted, classic)          | 0.096          |
|                                              | WCR-S (restricted, jackknife scores)   | 0.014          |
|                                              | WCU-S (unrestricted, jackknife scores) | 0.119          |

**Note:** Table reports two-sided p-values under alternative cluster-robust inference methods following Cameron et al. (2011) and MacKinnon et al. (2023a) for the main coefficient of leave-one-out employment rate on worker rights, reported in Table B.1, col. 2. Clusters calculated at the province level. CV1 denotes the conventional cluster-robust variance estimator based on unadjusted empirical cluster score vectors, with inference using the  $t(G-1)$  reference distribution, where  $G$  is the number of clusters. CV3 denotes the cluster jackknife variance estimator computed as a leave-one-cluster-out estimator centered on the full-sample coefficient estimate. CV3j denotes the cluster jackknife variance estimator centered on the average of the leave-one-cluster-out coefficient estimates. CGM wild cluster bootstrap denotes the Cameron–Gelbach–Miller wild cluster bootstrap, which applies Rademacher weights at the cluster level to regression residuals and computes bootstrap t-statistics under the null hypothesis using conventional cluster-robust standard errors (Cameron et al., 2008, 2011). WCR-C denotes the classic restricted wild cluster bootstrap based on unadjusted empirical score vectors and CV1 standard errors, with the bootstrap data-generating process imposing the null hypothesis. WCU-C denotes the classic unrestricted wild cluster bootstrap based on unadjusted empirical score vectors and CV1 standard errors, with the bootstrap data-generating process not imposing the null hypothesis. WCR-S denotes the restricted wild cluster bootstrap based on jackknife-adjusted score vectors, with inference computed using CV1 standard errors (MacKinnon et al., 2023b). WCU-S denotes the unrestricted wild cluster bootstrap based on jackknife-adjusted score vectors, with inference computed using CV1 standard errors. Bootstrap p-values are computed using the absolute value of the t-statistic and are based on  $B = 2^{10} = 1,024$  bootstrap replications using the Rademacher distribution. Data sources: Employment and Social Development Canada, Canadian Labour Force Survey.

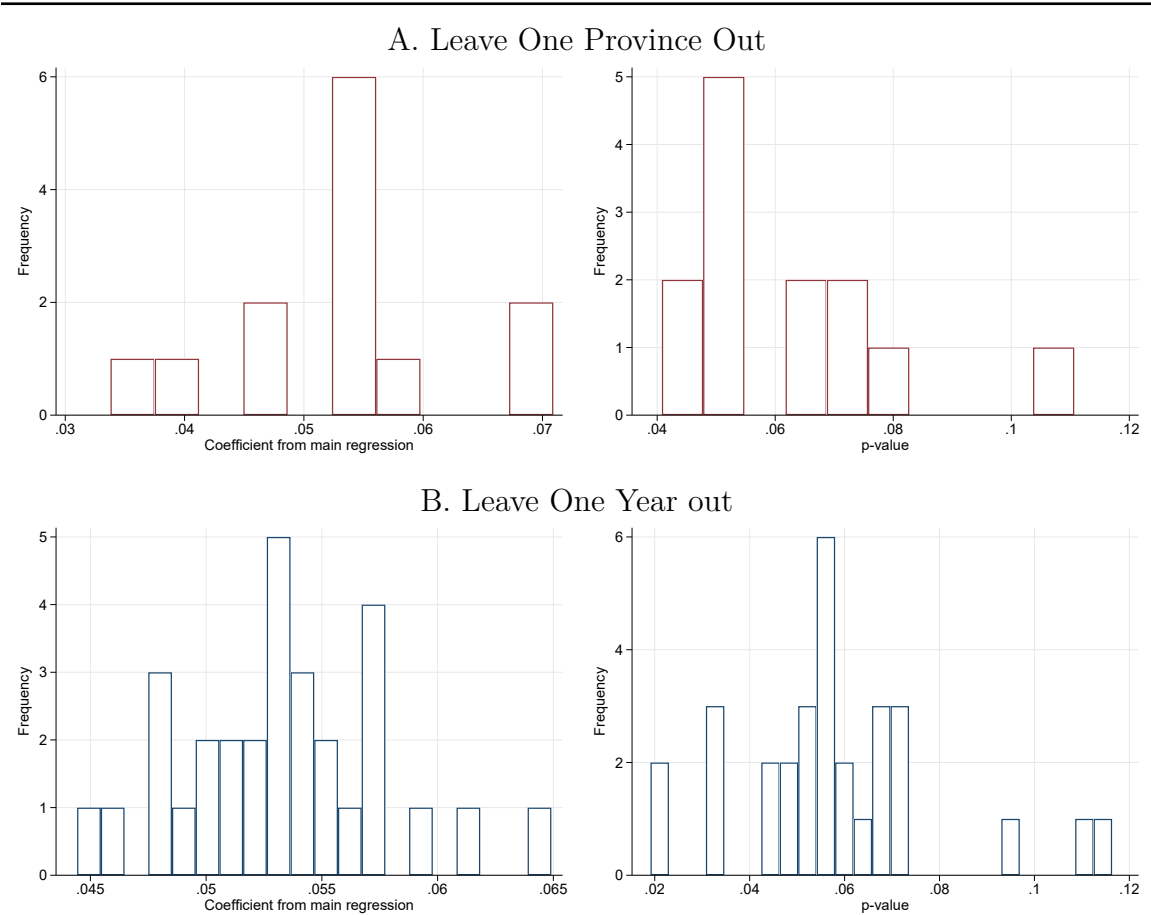


Figure B.2: Effect of Employment Rate on Worker Rights Clauses: Cluster Diagnostics



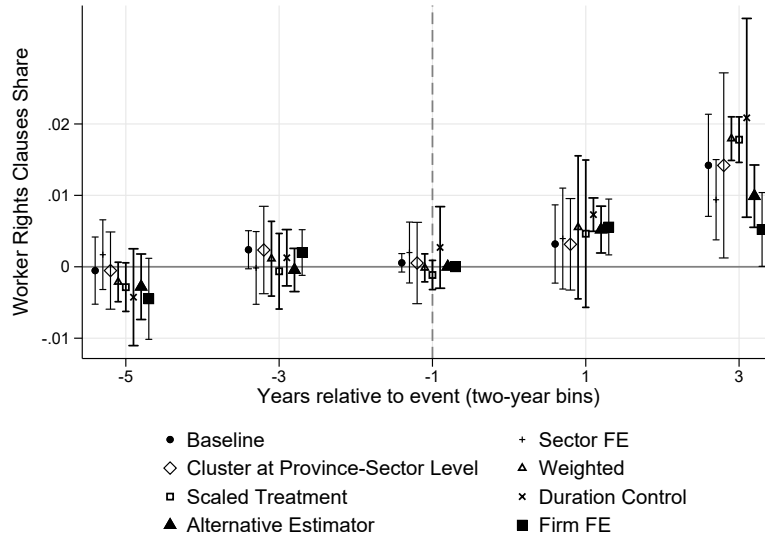
**Note:** Figure reports cluster diagnostic statistics following the sumclust procedure of MacKinnon et al. (2023c) for the main coefficient of leave-one-out employment rate on worker rights, reported in Table B.1, col. 2. Clusters are defined at the province level, yielding 10 clusters. The figure displays cluster leverage and partial leverage measures plotted against the number of observations per cluster, as well as against omit-one-cluster coefficient estimates. Cluster leverage measures the overall influence of each cluster on the estimation of the regression coefficients. Partial leverage measures the influence of each cluster on the estimation of the coefficient of interest (effect of the leave-one-out employment rate on worker rights), conditional on the remaining regressors. Omit-one-cluster coefficients are computed by re-estimating the regression while sequentially excluding each cluster. Vertical and horizontal reference lines indicate benchmark thresholds used in the sumclust diagnostic to flag potentially influential clusters. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards.

Figure B.3: Robustness: Employment Rate and Worker Rights Clauses (Leave-one-out)



**Note:** Figures present coefficients and p-values of effect of leave-one-out employment rate on worker rights clauses, dropping each province or year individually. Controls: Province-by-sector fixed effects and year-by-sector fixed effects. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards, Statistics Canada.

Figure B.4: Event Study: Employment Increases and Worker Rights



**Note:** Figure presents coefficients for time indicators before and after employment rate increase on share of worker rights clauses. Callaway and Sant’Anna (2021) estimator in the implementation of Rios-Avila et al. (2022), accounting for heterogeneous treatment effects and staggered treatment timing. Dynamic aggregation/event study effects, using doubly robust inverse probability weighting. Outcome: Share of worker rights (number of worker rights over the number of all clauses). Controls: Not-yet-treated observations. Event is defined as the largest employment-rate increase in a given province in the 1990s. Numbers on horizontal axis refer to years relative to event, binned to two years; i.e., -1 = two years prior to event. Inference: Standard errors clustered at the province level unless noted otherwise; 90 percent confidence intervals displayed. First estimator is baseline Callaway and Sant’Anna (2021) as described so far, second estimator is Callaway and Sant’Anna (2021) that adds sector fixed effects as control variables, third estimator is Callaway and Sant’Anna (2021) that clusters standard errors at the province-sector level, fourth estimator is Callaway and Sant’Anna (2021) that weights estimates by the event size (magnitude of the largest employment increase in a given province in the 1990s), fifth estimator is Callaway and Sant’Anna (2021) that scales treatment by the event size (magnitude of the largest employment increase in a given province in the 1990s), sixth estimator is Callaway and Sant’Anna (2021) that adds logarithm of contract duration as control variable, seventh estimator implements the alternative TWFE estimator by Cengiz et al. (2019), eighth estimator is Cengiz et al. (2019) that adds firm fixed effects. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards.

Figure B.5: Effect of Employment Rate on Worker Rights Clauses: Pre-Trend Sensitivity Analysis

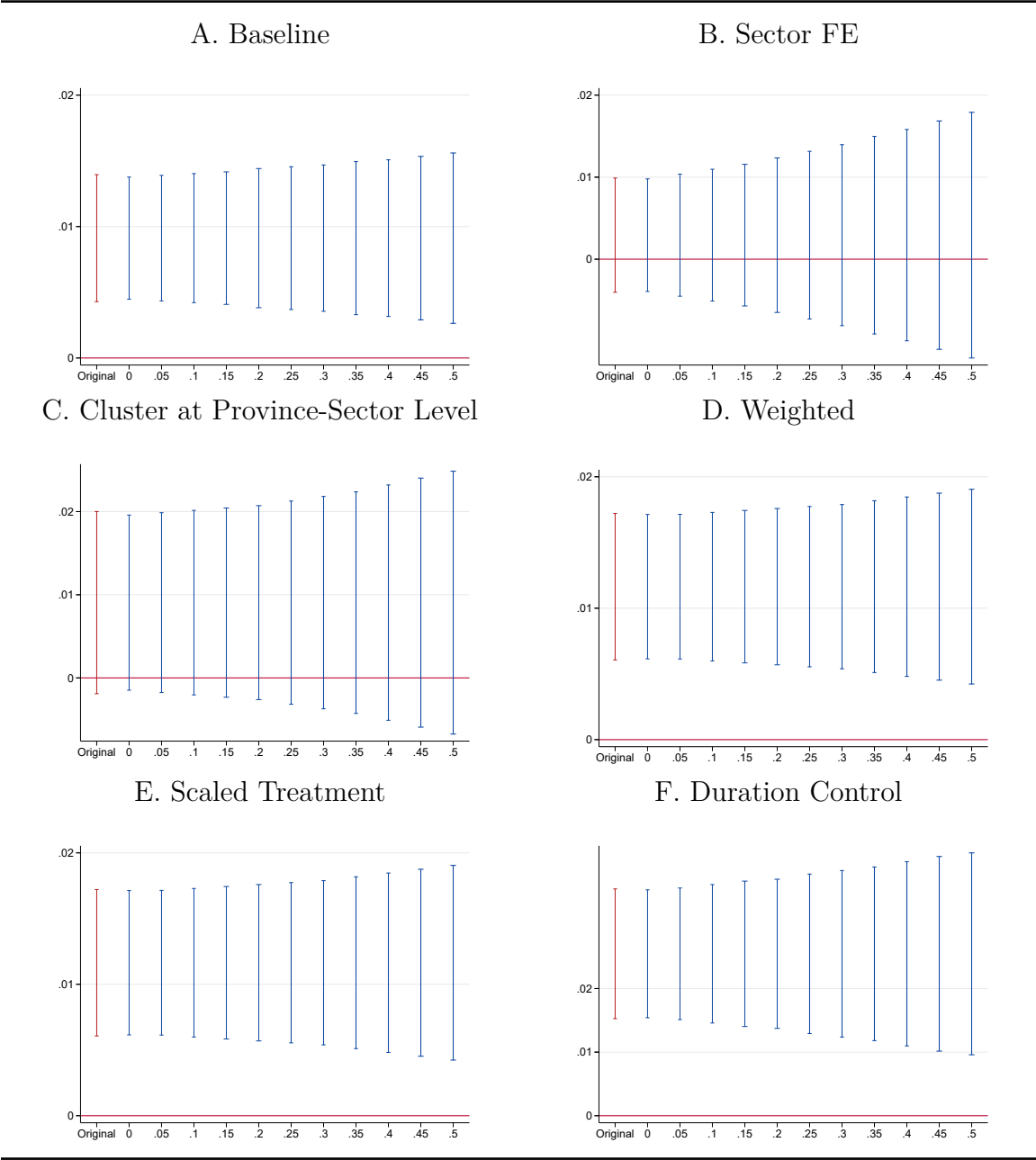
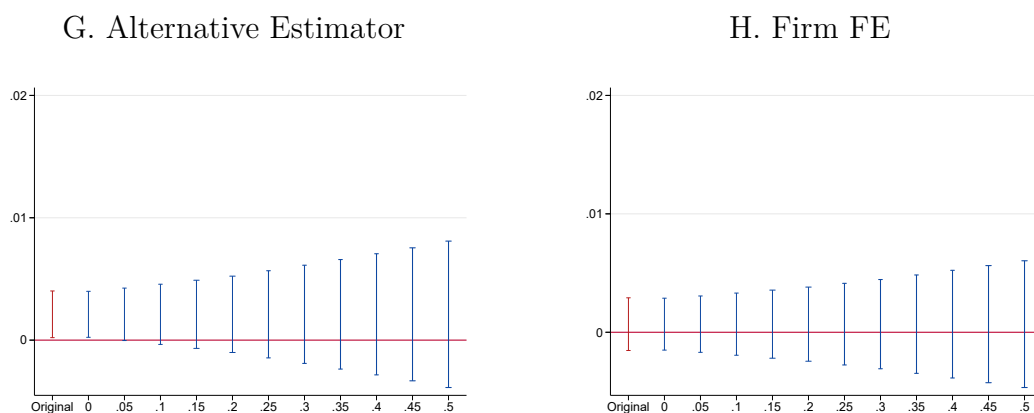
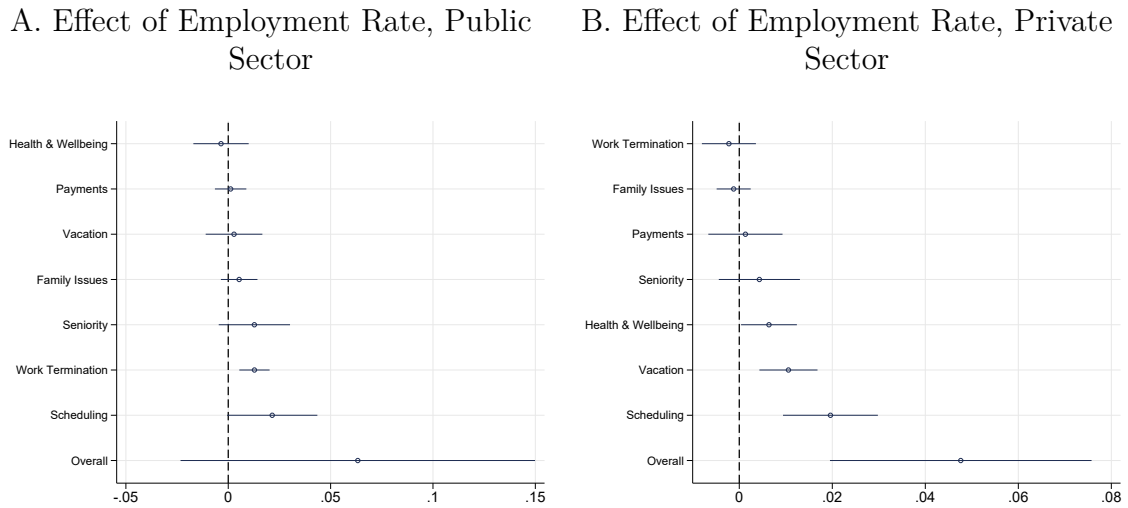


Figure B.5 (cont.): Effect of Employment Rate on Worker Rights Clauses:  
Pre-Trend Sensitivity Analysis



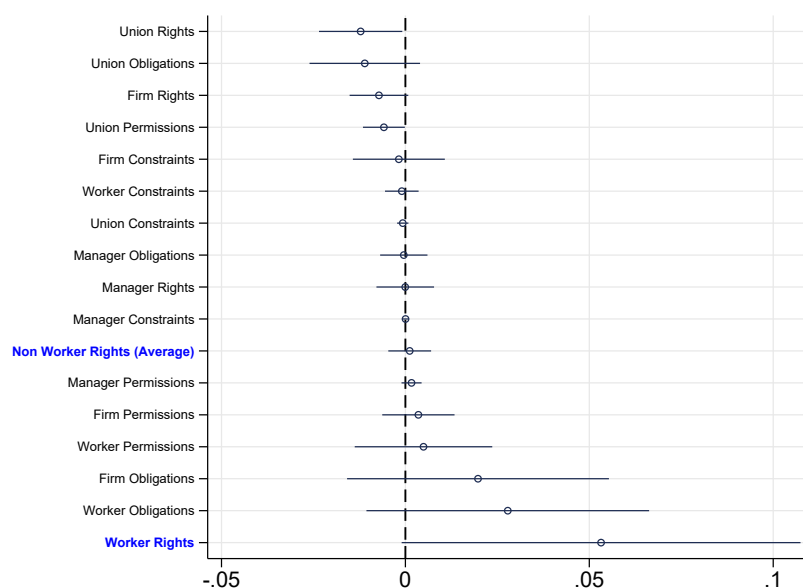
**Note:** Figure reports sensitivity intervals for potential violations of parallel trends using the method of Rambachan and Roth (2023). The outcome is the share of worker-right clauses. Red bars show the 90% confidence interval for the average post-reform event-study effect in Figure B.4 (Callaway and Sant’Anna, 2021). Blue bars allow post-treatment trend nonlinearity up to  $M$  times the maximum pre-treatment nonlinearity;  $M = 0$  permits a linear differential trend. Panels A–H show the baseline, sector fixed effects, province-sector clustering, event-size weights, scaled treatment, with contract duration control, the alternative TWFE estimator of Cengiz et al. (2019), and that estimator with firm fixed effects, respectively. Data sources: Employment and Social Development Canada, Center for the Study of Living Standards.

Figure B.6: Effect of Employment Rate on Worker Rights Clauses, by Sector and Category



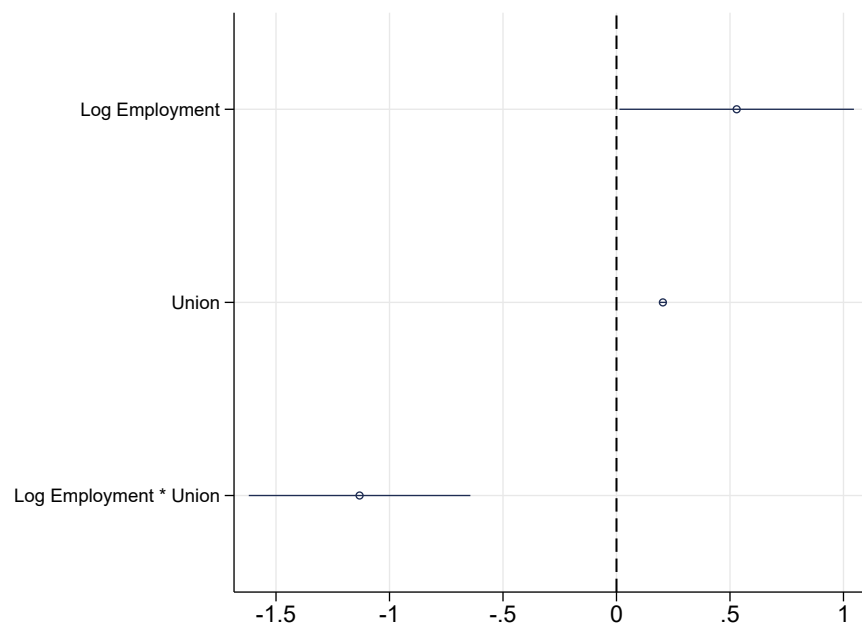
**Note:** Figures present coefficients and 95% confidence intervals of the effect of leave-one-out employment rate in public sector only (Panel A) and in private sector only (Panel B) on worker rights overall and separately by category, with the categories built using clustered sentence embeddings as described in Section 3.4. Each coefficient is from a separate OLS regression. Outcome: Share of worker rights clauses overall and by topic group (number of worker rights clauses of topic group in question over the number of all clauses). Treatment: Leave-one-out employment rate in a given sector, defined as the average log employment over other sectors in the same province-year. Controls: Province-by-sector fixed effects and year-by-sector fixed effects. Inference: Standard errors clustered at the province level. Data sources: Employment and Social Development Canada, Canadian Labour Force Survey.

Figure B.7: Effect of Employment Rate on Contract Terms



**Note:** Figure presents coefficients and 95% confidence intervals of the effect of leave-one-out employment rate on contract clause types. Each coefficient is from a separate OLS regression. Outcome: Clause type share (number of clauses of type in question over the number of all clauses). Treatment: Leave-one-out employment rate in a given sector, defined as the logarithmized average over the employment rates in other sectors. Controls: Province-by-sector fixed effects and year-by-sector fixed effects. Inference: Standard errors clustered at the province level. Data sources: Employment and Social Development Canada, Canadian Labour Force Survey.

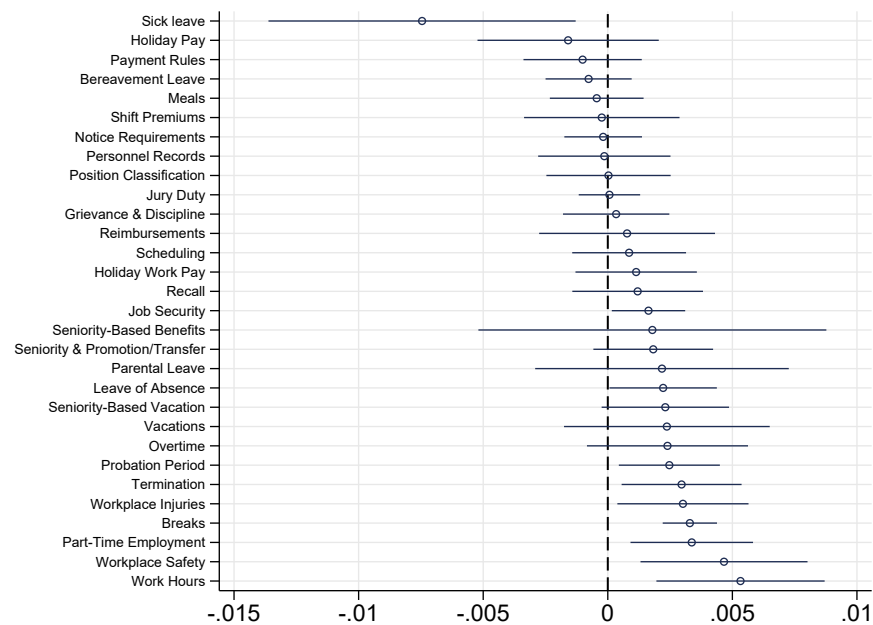
Figure B.8: Effect of Employment Rates and Union Status on Wages



**Note:** Figure presents coefficients and 95% confidence intervals of the effect of leave-one-out employment rate, union status on the interaction of employment rate and union status on individual wages. All coefficients are from the same OLS regression. Outcome: Individual wages, defined as worker's log hourly wage (before taxes and other deductions, but including tips, commission and bonuses). Treatments: Leave-one-out employment rate in a given sector, defined as the average of log employment rates in other sectors in the same province-year; union status, defined as an indicator variable that equals one if worker is a member of a union, and zero otherwise. Controls: Province-by-sector fixed effects and year-by-sector fixed effects. Sample: 1999-2006 (excludes years from the financial crisis 2007 onward). Inference: Standard errors clustered at the province level. Data source: Canadian Labour Force Survey.



Figure B.9: Effect of Employment Rate on Worker Rights Clauses by Topic



**Note:** Figure presents coefficients and 95% confidence intervals of the effect of leave-one-out employment rate on worker rights topics. Each coefficient is from a separate OLS regression. Outcome: Worker rights topics, defined as share of worker rights clauses that belong to given topic (number of clauses of topic in question over the number of all clauses). Treatment: Leave-one-out employment rate in a given sector, defined as the average log employment rates in other sectors in the same province and year. Controls: Province-by-sector fixed effects and year-by-sector fixed effects. Inference: Standard errors clustered at the province level. Data sources: Employment and Social Development Canada, Canadian Labour Force Survey.

## C Model Appendix: Collective Bargaining Agreements as Endogenously Incomplete Contracts

This appendix discusses why contract clauses have value, and how they are chosen. One views negotiated contract clauses as “amenities”, as introduced in Dube et al. (2022). The standard model of amenities, as reviewed by Mas (2025), views amenities in the context of the Rosen (1986) hedonic model. Amenities are like any other commodity, except that the firm purchases the commodity at pre-tax costs, and supplies it to the worker. From this perspective, contracted amenities should be just like the wage tables - just a list of the amenities to be supplied. The Rosen (1986) approach provides a good macro perspective, but it cannot explain why bargaining is so costly, and union contracts are long and growing over time. In the next section we discuss specific contract terms.

We show that they are consistent with the perspective outlined in the theory of the employment contract by Simon (1951). In that model, Simon observed that employment is characterized by giving the firm control rights. However, those rights cannot be unlimited, and hence they are *constrained ex ante*. Those constraints are imperfect, and hence he shows that there is a trade-off between employment and hiring a worker as a subcontractor. The next section illustrates this point with an explicit discussion of some contract terms in the contract with the workers of the Great Atlantic and Pacific Company of Canada, signed in 1998. These examples will show why we see in the data worker rights moving in conjunction with worker obligations and firm rights, and will yield a prediction that does not follow from the standard amenity model. See Section 8.5 and chapters 9 and 10 of MacLeod (2022) for a review of some of the literature on decision rights.

### C.1 The Economics of Union Contract Terms

This section discusses some of the clauses in the contract of The Great Atlantic and Pacific Company of Canada (contract 0050607a in the online contract list).

#### Article 2 on Right to Manage

Under Canadian common law, firms have the right to manage. This is explicitly stated in Article 2 of this contract:

Right to manage: The Union acknowledges that it is the exclusive function of the Company to:

(a) maintain order, discipline and efficiency; generally to manage the enterprises in which the Company is engaged and without restricting the generality of the foregoing, the right to plan, direct and control operations, direct the work forces, determine the number of personnel required from time to time, the standards of performance, the number and location of Distribution Centres and facilities, services to be performed and the methods, procedures and equipment in connection therewith, determine the goods to be handled and produced and the methods, processes and means of production and the control of material to be incorporated in the products produced, the products to be handled, the schedules of work, the extension, limitation, curtailment or cessation of operations; hire, discharge, direct, transfer, classify, promote, demote, lay-off, recall and suspend or otherwise discipline employees subject to the right of an employee to lodge a grievance in the manner provided in Article 7.

Observe that for example this includes schedules of work. Hence, if workers need some variation to a schedule to meet needs (go to the bathroom, see a doctor, attend a funeral for a family member) these need to be explicitly included in the contract.

#### **Article 4 on Leaves of Absence**

Here are clauses on getting permitted absence from work. Notice that these are allowed, but there is an obligation on the part of the worker to apply in advance. Notice how it is connected to their allowed vacation.

All requests for personal leave of absence in excess of one (1) week shall be made to the Director Warehousing and Distribution or his appointee in writing by the employee concerned and the letter should indicate in full the reason for requesting the leave of absence. The granting or refusal of all such leaves of absence shall be at the discretion of the Company and shall be made in writing to the employee concerned with a copy to the Union Office, within fourteen (14) days of the receipt of the written request, except that in the case of an emergency, the Manager, Personnel or his appointee undertakes to reply to the written request as soon as possible.

Any leave of absence in excess of one (1) day granted in conjunction with the employee's vacation will be deemed to follow his vacation period.

If an employee is elected to an office in the Union and the performance of such office requires leave of absence, such leave of absence (up to a maximum of twelve (12) months) without pay, shall be arranged between the Union, the employee and the Company. Leave of absence shall state the length of time the employee may be absent (up to a maximum of twelve (12) months). Such employee shall be restored without loss of seniority to his former position or to a similar position as soon as it is available, at the then prevailing wage rate at the expiration of his leave of absence. This provision becomes void, however, if the absence exceeds the period granted. A medical certificate shall provide a satisfactory reason for extending a leave of absence.

Leave of absence to attend Union conventions, courses and conferences will be granted without pay, and without loss of seniority provided that notice of one (1) month in the case of union conventions, and one (1) month where possible but no less than two (2) weeks in the case of courses or conferences is given to the Company and provided that not more than twelve (12) employees (twenty (20) employees in the case of the Stewards' Convention) are absent for such purpose at any one time.

Observe that such clauses would not be required if the company had been granting leave without any conflict. The fact that this clause exists is because there were disagreements on how leaves would be given, and hence explicit rules were developed. There are a couple of features that make such "amenities" complex commodities.

Technically this clause is an option contract - it is only triggered when an event occurs that requires the worker to take leave from their job and keep their job. When a person is hired this is certainly not something they would think about. Moreover, in a small company this sort of event would be handled through private negotiation at the time the need arises. It is an example of the kind of event in Simon's model that is addressed *ex ante*. In the absence of such a term, if a worker falls ill and cannot come to work, then that would be grounds for termination under the right to manage clause. This clause provides an exception in the case of illness. But such rights also face moral hazard, and hence there is a requirement of a medical certificate. Thus, we see that a benefit of not losing one's job when ill, is combined with the obligation

to provide proof of illness.

Since workers may benefit from additional training and having a union, the clause also allows for further training and participation in union activity that requires time off work. Again, these needs are really options since they are used only in some cases. Hence, in a large union with many workers, it will be possible to estimate the value of this clause on average, though not all members will benefit from the clause.

## **Article 7 Grievance Procedures**

One of the benefits of union membership is the existence of a formal grievance procedure. Again, not all employees benefit from such a procedure, and hence it is again an option contract that has a return when an employee believes that they have been unfairly dismissed. An example of terms from article 7 is:

A claim by an employee who has completed his probationary period that he has been suspended or discharged without just cause shall be treated as a grievance if a written statement of such grievance is lodged with the Distribution Centre Manager within five (5) working days after the employee is suspended or discharged. Such suspension or discharge grievance may be dealt with under the Grievance Procedure by:

- confirming the Company's action in suspending or dismissing the employee; or reinstating the employee with or without compensation for time lost; or by any other arrangement which is just in the opinion of the parties or the Arbitration Board, if appointed.

- The time limits as prescribed above may be modified by mutual agreement in writing of the parties.

- Should an employee hired after October 12, 1976 give false or misleading information in the completion of his Application for Employment Form or about his medical history, it will be considered just cause for discharge.

The complete article section is quite long and detailed. Like the previous clauses, it provides protection for workers in the case of an unfair dismissal, yet it also places obligations on workers in terms of timely submission of a grievance. It is interesting that the article also places a reporting requirement on workers when applying for a job. We do not have the details of the employment application, but one can imagine

that information such as previous criminal convictions are the sort of information that workers might not truthfully reveal. See MacLeod et al. (2024) for empirical evidence on how a grievance procedure can enhance performance.

## **Article 15 Discrimination**

The contract includes a relatively standard clause on discrimination.

The Company and the Union agree that there will be no intimidation, discrimination, interference, restraint or coercion exercised or practised by either of them or their representatives or members because of an employee's activity or lack of activity in the Union. The Company and the Union agree that there shall be no discrimination on account of race, colour, creed, age, sex or marital status. Employees who are not members of the bargaining unit shall not perform routine manual work normally performed by the bargaining unit.

While it is the case that discrimination has been illegal in Canada since the 1960 Charter of Human Rights, in the absence of this clause, it would be a case outside of the CBA. By including the clause, such cases would go through the grievance procedure discussed above. This is a service that the union can provide that is not readily available to individuals hired at will. Second, it provides protection for the union against charges of not fairly representing diverse members. With this clause, discrimination cases go through the formal grievance procedure, and hence would not be subject to a decision by the union on whether to support a discrimination case. Hence, such clauses not only provide value to a diverse membership, they provide protection for the union. Again, it is an option contract that only binds when there is discrimination.

## **Article 16 Work Scheduling Issues.**

Scheduling issues are a high priority issue for unions. The issue is that the firm often needs overtime workers. Since the pay is higher, in many cases there is an excess supply of workers available, hence one needs a system to select them. In other cases, the firm may face a supply constraint. There needs to be a system on how this supply is to be met. Here we cite the terms when there is a shortage of volunteers:

In the event that there are still insufficient numbers of volunteers to meet the overtime requirements, then employees may have to be scheduled in accordance with 16.02 (b) (I) in reverse order of seniority. The Company will endeavour to utilize in a Distribution Centre those employees listed on the Daily Overtime Lists of the other Distribution Centres, by seniority provided such employees have the physical fitness, skill and ability to do the work, before scheduling employees to work overtime. An employee, who, having been required at the end of his regular shift to work overtime at another Distribution Centre, must travel from the Frozen Food Distribution Centre in Weston to another Distribution Centre, or, from another Distribution Centre to the Frozen Food Distribution Centre in Weston, shall be allowed payment for thirty (30) minutes at his regular straight time hourly rate of pay for that purpose. Where the Company indicates at the time of the re posting that more employees than are required have signed the D.O.L., then employees who signed the List but who in view of the circumstances reconsider their position and no longer wish to be considered for overtime, should so signify on the re-posted list. The Company will advise those employees who sign the D.O.L. (or if applicable the Re-posted List) whether or not they will be needed to work overtime not later than two (2) hours before the completion of the shift concerned where possible. An employee having indicated his willingness to work overtime but who subsequently reconsiders, must, one (1) hour in advance of the end of his regular shift where possible, notify his immediate supervisor before leaving the Distribution Centre.

Given that overtime needs cannot always be anticipated in advance, we are again faced with an option contract that can force some workers to do overtime work. By specifying the conditions in advance, workers will not feel unfairly treated, which in turn can enhance work quality (Fehr et al., 2009).

### **Article 18 Vacation Pay**

Vacation pay is a traditional amenity since all employees will use and benefit from these terms. A feature of the amenity is that it increases with years of service, that in turn rewards commitment to and investment in the company.

An employee on the active payroll of the Company who has completed continuous service of one year, five years, nine years, sixteen years, or twenty-three years as of an employee's anniversary date of employment shall receive vacation with pay as follows: Vacation pay at employee's regular straight time hourly rate as of pay period immediately prior to vacation [that is increase with years of service - our notes].

The regular vacation period shall extend from March 1st to the end of February.

The Company will post a general announcement in December requesting employees to determine their vacation preference if any for the following year. During the first two full weeks of January, commencing with the first Sunday in January, employees will be canvassed by seniority within a Distribution Centre regarding their prime vacation preference consisting of up to two (2) weeks. Those employees who have a preference must so state at the time that they are canvassed by the Company.

The preliminary vacation schedules will be finalized and posted by February 1st.

## **Article 24 Health Benefits**

Even though Canada has a public health care system for all citizens, one can have benefits in addition to the standard services. In particular, OHIP, the Ontario Hospital Insurance Plan is not free, and hence it is an amenity to have this paid by the company with pretax dollars.

Subject to the terms and conditions of the Master Plans and Policies relating thereto, the Company agrees to continue in effect the Group Insurance Plans on the basis that the payment of the applicable premiums therefore shall continue to be made on the same basis as in effect immediately prior to the execution date of this Agreement. For eligible employees who have completed three (3) months of continuous service and while such employees remain in the active employ of the Company:

- (a) Ontario Hospital Insurance Plan
- (b) Supplementary Hospital Insurance Plan which provides Accidental Death & Dismemberment Insurance and supplementary hospital expense



benefits over and above O.H.I.P., such as ambulance expense, semi-private accommodation, extended health care including major medical and prescription drug plan. The major medical plan to be amended to provide that up to \$1,500 in each calendar year can be applied towards reinstating the revised lifetime maximum of 20,000, effective May 1, 1993.

(c) Such Supplementary Hospital Insurance Plan to include an optical plan on the basis of a twenty – five(25.00) dollar single and family deductible. The Plan shall provide a benefit of up to one hundred (100.00) dollars(one hundred and twenty–five (125.00) dollars, effective January 1, 1996) over two (2) consecutive years for frames, lens, and prescription glass, and up to two hundred (\$200.00) dollars over two (2) consecutive years for artificial eyes, services of visual training, and non-cosmetic corrective prescription contact lens, resulting from visual acuity of less than 20/40 or corneal disease (special cases only).

## Discussion

There are a number of lessons from these contract terms. First, articles 18 and 24 correspond to amenities as used in the literature (Mas, 2025). As Mas (2025) observes, if these amenities are valued by most employees, and since they can be purchased by the firm before taxes, then it is rational to include them in the employment contract. For the same reason, firms without unions will also provide these amenities, though, as Mas (2025) discusses, there is observable variation in the level of amenities provided by private sector firms.

What is interesting is that many clauses provide members with *complex* rights that are difficult to evaluate. Let  $i \in K$  index the clauses in contract  $K$ , then take the standard contract form:

Clause  $i \in K$  states that if event  $\theta_i \in \Theta$  occurs, then right  $r(i)$  is provided by the clause that has a benefit to the worker of  $a(i)$ .

The value of this clause from the union’s perspective is  $\beta(i) = \lambda(i)a(i)$ , where  $\lambda(i) = \Pr[\theta_i]$  is the probability that event  $\theta_i$  occurs. The conditional nature of the benefit has a number of implications that we exploit for the theory underlying our regressions. First, when employees are hired they are not likely to be aware of all the adverse events in  $\Theta$  and, even if they were aware, they would not be able to contract over

them. In the case of non-union firms they might be listed in the employee handbook (the authors, like most readers of the paper, did not read their employee handbooks before accepting their jobs). However, the union will be dealing with just adverse events for their membership, and hence over time will have some information on both the likelihood of an event and its consequence. The union will negotiate a contract  $K_d$  at date  $d$  that will specify a list of events, and associated terms  $i \in K_d$  that will yield their members a benefit with value  $a(i)$ .

Given that there is an unlimited number of potential events, but limited time, this implies that at date  $d$  the contract  $K_d$  will be *incomplete*. It will contain clauses that have the highest *ex ante* value, given by  $\beta(i)$ . Moreover, some adverse events may not have occurred, and hence would not be included until they do occur. The impression one gets from reading terms, such as those above, is they are based on actual experienced outcomes.

The fact that the set of potential terms is large, and there is scope for learning, implies that contracts become larger and more complex over time ( $K_d \subset K_{d+1}$ ). Though, as we show in the validation section, where there are sufficiently adverse events, contract length may decrease. In summary, what we see is that many contract terms are conditional, and only apply when an adverse event occurs. In a large bargaining unit these events are more frequent at the bargaining unit level, but since they may not be frequent at the individual level they may not be salient for new hires. In the next section we derive the implication for contracting over time between the firm and the union, where contract clauses have value  $\beta(i)$ , and the number of clauses negotiated each period is limited, either due to limited time for negotiation, or lack of experience to make an event  $\theta$  relevant.

## C.2 A Simple Optimal Contract Model

The formal models in Mas (2025) view amenities as a commodity that is supplied as long as the marginal benefit is greater than the cost. The section above shows that for the most part clauses in an employment contract cannot be thought of in terms of a commodity. The purpose of this section is to show that one can provide a contract term based approach to contract length, that in turn provides a framework to interpret the empirical results in this paper. The framework that builds on observed employment contracts is characterized as a set of clauses that have value

in expectation for union members. The value of each term is assumed to be  $\beta(i)$  in expectation. Without loss of generality it is assumed that  $\beta(i)$  is decreasing in  $i$ . It is also assumed that  $\beta''(i) > 0$  and  $\lim_{i \rightarrow \infty} \beta(i) = 0$ . The cost of rights is normalized to have the same marginal cost  $c$ . Amenities are assumed to be workplace public goods, and so their costs do not increase with firm size, as in Mulligan and Shleifer (2005).

Each amenity  $a(i)$  is implemented via a fixed contract clause. It is assumed that clauses are nominally expensive and hence given  $T$  clauses, it is efficient to maximize the value of amenities delivered with  $T$  clauses. The total value of amenities with a contract of length  $T$  is:

$$A(T) = \int_0^T \beta(i) di, \quad (4)$$

and hence  $A'(T) = \beta(T)$  and  $A''(T) = \beta'(T) < 0$ .

Workers have constant marginal product  $p$  and are paid a uniform wage  $w$ , taxed at a rate  $\tau$ . Workers like rights to actions (including amenities) while employers dislike them with cost  $cA(T)$ . Union collective bargaining agreements are contracts over wages and ex-ante actions that workers are allowed to take, or amenities that firms must provide. The preferences of the union per worker over wages and amenities are given by a constant elasticity of substitution function:

$$V(T, w) = \left( A(T)^\rho + ((1 - \tau)w)^\rho \right)^{1/\rho}, \quad (5)$$

where  $\tau \in (0, 1)$  is the personal income tax rate. For this standard CES functional form the elasticity of substitution between amenities and net wages  $(1 - \tau)w$  is  $\sigma = \frac{1}{1-\rho}$ , where  $\rho \in (0, 1)$ .

The firm will make an offer to workers of a contract with  $T$  amenities, with value  $A(T)$  and wage  $w$ , denoted by  $K = \{T, w\}$ . This offer faces a noisy outside option given by the union's strike threat. More precisely, if  $V(K) < V^0 + \epsilon$  then workers will go on strike. If the support of  $\epsilon$  is positive, this ensures that workers get at least  $V^0$ .

The timing is:

1. Firms choose the wage  $w$  and the number of amenities/rights  $T$ , producing a total value of amenities/rights  $A(T)$ .
2. If  $V(K) < V^0 + \epsilon$ , the workers strike and get  $V^0$ , the outside option. If not, then the union accepts the contract that is then implemented. Production begins.

3. If the action is contracted ( $i \leq T$ ) then a fraction  $\lambda(i)$  of workers choose to exercise the right or amenity  $a(i)$ . If the action is not contracted, the manager chooses the action  $a^f(i)$ .
4. Production is completed. Utility is realized and wages are paid to workers that are still employed.

Moving to the production function. Let  $G(V(K) - V^0) = \Pr[V(K) - V^0 > \epsilon]$  be the probability that workers do *not* go on strike, where  $V^0$  is the outside option. It is assumed that when a strike occurs, profits are zero. Assuming constant returns to scale, the profit function of the firm offering contract  $K = \{T, w\}$  is

$$\Pi(K) = (pN - wN - c \times A(T)) G(V(K) - V^0), \quad (6)$$

where  $N$  is the size or demand for the firm's product (which is not modeled),  $p$  is the product price,  $w$  the wage rate, and  $c \times A(T)$  is the cost of providing amenities using  $T$  contract terms. The firm offers the union/workers efficient contract terms  $K$  that minimize costs for a given level of union utility.

To get convenient closed-form solutions, let  $G' = g$  on its support  $[0, 1/g]$ . In that case we have  $G(x) = gx$ , for  $0 \leq x < 1/g$  and  $G(x) = 1$  for  $x \geq 1/g$ . This implies that if  $V \geq V^0 + 1/g$  then there will be no strike. Thus, the probability of no strike is:

$$\Pr[V(K) - V^0 > \epsilon] = G(V(K) - V^0) = \min\{1, \max\{0, g(V(K) - V^0)\}\} \in [0, 1]. \quad (7)$$

Note that this expression shows that the probability of a strike may depend on the value of the contract and of the outside option. We use this to motivate an empirical comparison of strike intensity with taxes. Table A.21 shows evidence that an increase in the local tax rate increases strike intensity, as measured by number of worker days on strike. Hence,  $g(V(K) - V^0)$  is decreasing. This can occur either due to more uncertainty ( $g$  is smaller) or fewer rents ( $V(K)$ ) is smaller, or both. That supports our interpretation of the shocks.

Now we present our main proposition.

**Proposition 1.** *Suppose  $g$  is sufficiently small, so that there is a positive probability*

of a strike. At an efficient contract  $K$ , the wage as a function of contract terms is:

$$w^*(1 - \tau) = A(T) \left( \frac{\hat{c}}{N} \right)^{1/(1-\rho)}, \quad (8)$$

where  $\hat{c} = c(1 - \tau)$ . Hence, an increase in the tax rate  $\tau$  lowers the wage relative to amenities. Given the number of pro-worker clauses  $T^*$ , union utility is

$$V(T^*) = A(T^*) v \left( \frac{\hat{c}}{N} \right), \quad (9)$$

where

$$v \left( \frac{\hat{c}}{N} \right) = \left( 1 + \left( \frac{\hat{c}}{N} \right)^{\rho/(1-\rho)} \right)^{1/\rho}.$$

If both wages and amenities are positive in equilibrium, then the equilibrium level of amenities is given by:

$$A(T^*) = \frac{1}{2} \left\{ \frac{pN}{c \left( \left( \frac{\hat{c}}{N} \right)^{\rho/(1-\rho)} + 1 \right)} + \frac{V^0}{v \left( \frac{\hat{c}}{N} \right)} \right\} \quad (10)$$

$$= \frac{1}{2} \left\{ \frac{pN}{cv \left( \frac{\hat{c}}{N} \right)^\rho} + \frac{V^0}{v \left( \frac{\hat{c}}{N} \right)} \right\}. \quad (11)$$

The proof is provided in Appendix C.4.

From (11), we get the following corollary:

**Corollary 2.** *The number of amenities/rights  $T^*$  increases with an increase in the income tax  $\tau$ , firm size  $N$ , firm productivity  $p$ , and the worker's outside option  $V^0$ .*

This result is consistent with our empirical findings. The model shows that the results follow from an efficiency-minded firm offering a contract to a union subject to a strike threat. One would obtain similar results from an efficient bargaining model, though the magnitudes of the effects will vary with the details.

### C.3 Explaining Contract Categories

The previous analysis makes the basic point that if the contract provides unpriced amenities to workers then an increase in the income tax leads to an increase in contracted worker rights. This section discusses the forces that lead to the addition of other clauses in the collective agreement. To simplify matters, clauses are divided into three groups, worker rights, denoted by  $T^W$ , firm rights, denoted by  $T^F$ , and all other clauses,  $T^O$ .

The model in the previous section is technically equivalent to supposing that a worker must get an outside option  $u^0$ , that implicitly incorporates any cost of strikes. Thus, we may suppose that a worker's utility is given by:

$$U = V(T^W, (1 - \tau)w) = u^0. \quad (12)$$

From this, we can solve for the wage as  $w(T^W, \tau, u^0)$ . It is then assumed that the benefit of contracting to the firm is given by a twice differentiable, concave fixed benefit  $\pi(\vec{T})$ , where the number of worker rights, firm rights and other clauses is given by  $\vec{T} = \{T^W, T^F, T^O\} \geq \vec{0}$ . It is assumed to satisfy:

$$\pi(\vec{0}) = 0, \quad (13)$$

$$\partial\pi/\partial T^i < 0, i = W, F, \quad (14)$$

$$\partial\pi/\partial T^O(0, 0, T^{*O}) = 0, \quad (15)$$

where  $T^{*O} > 0$  is the optimal number of other clauses given that there is a union. The clauses given by  $T^O$  provide definitions and basic parameters for the collective agreement. Finally, we assume that clauses are complements:

$$\frac{\partial^2 \pi}{\partial T^i \partial T^j} \geq 0, \quad i \neq j, \quad i, j \in \{W, F, O\}. \quad (16)$$

This assumption can be viewed as a formal implementation of the Simon (1951) model. In that model he assumes that when the worker agrees to employment she gives the right to the firm to direct her work. However, such a right cannot be unlimited. For example, the firm might ask the worker for extra hours of work. Thus, any right given to the firm is counterbalanced by constraints. Conversely, if the firm gives the worker a right, it might be constrained. For example, the worker may have the right to seek

medical attention during the hours of employment. However, to ensure that the visits are necessary, the firm might add the clause that the worker must provide a letter from the doctor. This is an example of where a worker right (the right to seek medical treatment) is paired with the firm's right to verify the need for the appointment. This effect is captured by condition (16).

Combining the benefits from contracting with the firm's costs and revenues, firm profits are given by:

$$\Pi(\vec{T}, \tau, u^0) = py(N) + \pi(\vec{T}) - N \times w(T^W, \tau, u^0), \quad (17)$$

where  $N$  is the number of workers at the firm. It follows that:

**Proposition 3.** *An optimal contract characterized by:*

$$\vec{T}(\tau, u^0) = \arg \max_{\vec{T} \geq \vec{0}} \Pi(\vec{T}, \tau, u^0)$$

*has greatest and least elements that are nondecreasing in  $\tau$  and  $u^0$ ; that is, more worker rights, firm rights and other clauses,  $\vec{T} = \{T^W, T^F, T^O\}$ .*

*Proof.* By (12), the wage  $w(T^W, \tau, u^0)$  depends on  $\vec{T}$  only through  $T^W$ , so from (17) we have  $\partial^2 \Pi / \partial T^i \partial T^j = \partial^2 \pi / \partial T^i \partial T^j \geq 0$  for  $i \neq j$  by (16); hence  $\Pi$  is supermodular in  $\vec{T}$ . Solving (12) gives  $(1 - \tau)w = ((u^0)^\rho - A(T^W)^\rho)^{1/\rho}$ , which is decreasing in  $T^W$  and independent of  $\tau$ . Differentiating  $-Nw$  then yields  $\partial^2 \Pi / \partial \tau \partial T^W > 0$  and  $\partial^2 \Pi / \partial u^0 \partial T^W > 0$  when  $T^W > 0$ , while  $\partial^2 \Pi / \partial \tau \partial T^i = \partial^2 \Pi / \partial u^0 \partial T^i = 0$  for  $i = F, O$ . Thus  $\Pi$  has increasing differences in  $(\vec{T}; \tau)$  and  $(\vec{T}; u^0)$ . By Topkis's monotonicity theorem (Topkis, 1998), the greatest and least maximizers  $\vec{T}(\tau, u^0)$  are nondecreasing in  $\tau$  and  $u^0$ . Since supermodularity implies quasisupermodularity and increasing differences imply the single-crossing property, the same conclusion follows from the monotonicity theorem of Milgrom and Shannon (1994).  $\square$

This proposition illustrates that the effect of both taxes and the outside option on the number of clauses in a contract is very general. It also implies that as the firm gets larger ( $N$  increases) the number of clauses in a contract increases. The relative importance of these effects can be captured by using clause shares as outcomes. This model predicts that the numbers of clauses  $T^O$  and  $T^F$  cannot increase without an increase in the number of worker rights. The extent to which these clauses vary is an

empirical question. When regressions are run in terms of shares, then this provides information on how the relative number of clauses varies with changes in the income tax and outside option.

#### C.4 Proof of Proposition 1.

*Proof.* It is assumed that a strike occurs with positive probability, hence  $V(K|\tau) < V^0 + 1/g$ . The first-order condition for wages is given by:

$$\frac{\partial \Pi}{\partial w} = -gN\Delta V + MR \times g \frac{\partial V}{\partial w} = 0,$$

where  $\Delta V = V(K|\tau) - V^0 > 0$ . This inequality follows from the fact that the product price is sufficiently high that profitable production is possible. The marginal revenue from production is given by  $MR = (p \times N - w \times N - c \times A(T))$ .

This implies:

$$\frac{\partial V}{\partial w} = \frac{N \times \Delta V}{MR}.$$

We get a similar formula for the level of amenities,  $T$ :

$$\frac{\partial \Pi}{\partial T} = -c \times A'(T) \times g \times \Delta V + MR \times g \frac{\partial V}{\partial T} = 0,$$

and thus:

$$\frac{\partial V}{\partial T} \frac{1}{cA'(T)} = \frac{\Delta V}{MR}.$$

From this we get:

$$\frac{cA'(T) \times \partial V / \partial w}{\partial V / \partial T} = N. \tag{18}$$

Next we compute the effects on union utility:

$$\begin{aligned} \frac{\partial V}{\partial w} &= V^{(1-\rho)} \times \{(1-\tau)w\}^{\rho-1} (1-\tau), \\ \frac{\partial V}{\partial T} &= V^{(1-\rho)} \times \{A(T)\}^{\rho-1} A'(T). \end{aligned}$$

We can plug these back into (18). Notice that the  $A'(T)$  drops out and we get (using



the fact that  $\rho < 1$ ):

$$\frac{cA'(T) \times V^{(1-\rho)} \times w^{\rho-1} (1-\tau)^\rho}{V^{(1-\rho)} \times \{A(T)\}^{\rho-1} A'(T)} = N,$$

or

$$\frac{w}{A(T)} = \frac{c^{1/(1-\rho)} (1-\tau)^{\rho/(1-\rho)}}{N^{1/(1-\rho)}}, \quad (19)$$

$$w(1-\tau) = A(T) \left( \frac{\hat{c}}{N} \right)^{1/(1-\rho)}, \quad (20)$$

where  $\hat{c} = c(1-\tau)$ , which gives us (8).

Putting this into union preferences gives us:

$$\begin{aligned} V^*(T) &= \left( A(T)^\rho + \left\{ A(T) \left( \frac{\hat{c}}{N} \right)^{1/(1-\rho)} \right\}^\rho \right)^{1/\rho}, \\ &= A(T) \left( 1 + \left( \frac{\hat{c}}{N} \right)^{\rho/(1-\rho)} \right)^{1/\rho}, \\ &= A(T) v \left( \frac{\hat{c}}{N} \right), \end{aligned}$$

where

$$v \left( \frac{\hat{c}}{N} \right) = \left( 1 + \left( \frac{\hat{c}}{N} \right)^{\rho/(1-\rho)} \right)^{1/\rho}.$$

To compute the optimal contract length we substitute (8) and (9) into the profit function:

$$\Pi(T) = \left( pN - \left( \left( \frac{\hat{c}}{N} \right)^{1/(1-\rho)} \times \frac{N}{(1-\tau)} + c \right) \times A(T) \right) \times G(V(T) - V^0).$$

Given that a monotonic transformation does not change the optimization problem, we can divide by  $g$  (we have assumed that strikes occur with positive probability) to

get:

$$\hat{\Pi}(T) = \left( pN - \left( \left( \frac{\hat{c}}{N} \right)^{1/(1-\rho)} \times \frac{N}{(1-\tau)} + c \right) \times A(T) \right) \times (V(T) - V^0).$$

The first-order condition is:

$$0 = \frac{d\Pi}{dT} = - \left( \left( \frac{\hat{c}}{N} \right)^{1/(1-\rho)} \times \frac{N}{(1-\tau)} + c \right) \times A'(T) (V(T) - V^0) + \\ \left( pN - \left( \left( \frac{\hat{c}}{N} \right)^{1/(1-\rho)} \times \frac{N}{(1-\tau)} + c \right) \times A(T) \right) A'(T) v \left( \frac{\hat{c}}{N} \right).$$

The  $A'$  terms drop out. Let:

$$h(\tau, N) = \left( \left( \frac{\hat{c}}{N} \right)^{1/(1-\rho)} \times \frac{N}{(1-\tau)} + c \right) \\ = c \left( \left( \frac{\hat{c}}{N} \right)^{\rho/(1-\rho)} + 1 \right).$$

Then we get

$$h(\tau, N) \left( A(T) v \left( \frac{\hat{c}}{N} \right) - V^0 \right) = (pN - h(\tau, N) A(T)) v \left( \frac{\hat{c}}{N} \right) \\ 2h(\tau, N) A(T) = pN + V^0 h(\tau, N) / v \left( \frac{\hat{c}}{N} \right).$$

Thus we have:

$$A(T^*) = \frac{1}{2} \left\{ \frac{pN}{h(\tau, N)} + \frac{V^0}{v \left( \frac{\hat{c}}{N} \right)} \right\}$$

and we get the following expression for optimal contract length:

$$A(T^*) = \frac{1}{2} \left\{ \frac{pN}{c \left( \left( \frac{\hat{c}}{N} \right)^{\rho/(1-\rho)} + 1 \right)} + \frac{V^0}{v \left( \frac{\hat{c}}{N} \right)} \right\} \\ = \frac{1}{2} \left\{ \frac{pN}{cv \left( \frac{\hat{c}}{N} \right)^\rho} + \frac{V^0}{v \left( \frac{\hat{c}}{N} \right)} \right\}.$$

Clearly, the right hand side is increasing in  $V^0$ ,  $p$  and  $N$ , and decreasing in  $c$  and  $(1 - \tau)$ . Since the left-hand side is monotonically increasing in  $T^*$ , we have the needed comparative statics.  $\square$

## D Construction of Worker-Right Topics

This appendix provides additional details on the construction of the worker-right topics and the measures of wage substitutability reported in Table 3.

### D.1 Topic Construction

After identifying worker-right clauses using the grammatical parser described in Section 3, we first take each sentence and vectorize it using a transformer-based sentence encoder (Reimers and Gurevych, 2019). These 768-dimensional vectors encode context-sensitive information based on a pre-training task predicting logical relationships between sentences. The resulting sentence embeddings have a spatial representation in which semantically similar sentences are located close to one another, corresponding to clusters of related clauses. In line with that, we construct topics using k-means clustering applied to the sentence embeddings, with separate clusters constructed for each clause type – in particular, within the set of worker rights. These clusters can then be understood as prototypes representing the semantic distribution of rights.

Like popular topic model algorithms such as Latent Dirichlet Allocation (LDA) (Blei et al., 2003; Hansen et al., 2017), our clustering method learns topics inductively from the unlabeled texts. There are three main advantages of clustered embeddings over LDA for our context. First, embeddings capture semantic relationships across words interdependently, unlike bag-of-words approaches that treat words independently. For example, our method registers that “employee” and “worker” are synonyms, whereas LDA treats those words as independent. Second, the method learns context-sensitive representations. For example, the word “lunch” can have a different meaning in clauses about worker lunch breaks, versus clauses about the lunch shift for restaurant workers. LDA does not make such a distinction. Third, our clustering method assigns each individual clause to a single topic, rather than a distribution across topics. That results in a simpler dataset, and makes more sense for short

documents (single sentences) rather than long documents.

Given that these topics are for descriptive purposes, we take a practical approach in tuning the clustering algorithm. After some experimentation, we selected 32 clusters and excluded two teacher-specific clusters, leaving 30 topics for the cross-sector analysis.<sup>39</sup> These topics are listed and annotated in Table 3. Each row corresponds to a topic, and the table has six columns. The first column (“Narrow Topic Label”) provides hand-annotated narrow topic labels. Skimming through the list, we see intuitive sets of benefits, as well as provisions describing workplace rules and requirements. Despite conditioning on worker rights only, there is still plenty of heterogeneity in the text such as the overlap between the work hours and overtime topics.

For further interpretability, we further manually aggregated the 30 “narrow” topics into seven “broad” topics (column 2): Family Issues, Health & Well-Being, Payments, Scheduling, Seniority, Vacations, and Work Termination. Appendix Table A.10 shows the match between narrow and broad topics and ranks the broad topics by frequency (see also Appendix Figure A.8). Interestingly, the largest share of worker rights are on scheduling. That allocation of rights makes sense in light of the point in Aghion and Tirole (1997) that contracts should allocate decision rights to workers when they have better information than employers. Workers are likely to be better-informed regarding their time constraints, so it makes sense that CBAs tend to give workers rights around the schedule. Further, to assess within-contract consistency of topics, we compute correlations between worker-right clauses and the corresponding firm-obligation clauses within similar topical categories. As shown in Appendix Table A.11, the correlations are positive across all matched topics, although their magnitudes are modest.

## D.2 Wage Equivalence

Table 3 is sorted by the third column, “Wage Equivalence”. This score is motivated by a key conceptual distinction in the space of worker rights that is whether a right is priced, i.e., more similar to (and potentially substitutable with) wages or not. The priced benefits can be distinguished from more rule-like provisions, the benefits of which are more subjective and may vary from one employee to another. To place these provisions on a common scale, we first construct a labeled training set of 2,000

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<sup>39</sup>See Appendix Table A.10 and Appendix E for descriptive information about those.

randomly drawn worker rights clauses by using GPT-4.1-mini to assign each clause an integer from zero to ten, where higher values indicate greater wage substitutability, and then supplement these labels with 100 structured human annotations.<sup>40</sup> We then estimate a regression model that maps pretrained MPNet embeddings of clauses to a continuous scale of wage substitutability.<sup>41</sup> The trained model is subsequently applied to the full corpus. Finally, we aggregate these scores within each topic to obtain topic-level wage-equivalence scores. Topics that have the highest predicted wage-equivalence scores, shown at the bottom of Table 3 (e.g. shift premiums, holiday work pay, and payment rules), are the most similar to wages and tend to reflect the standard benefits that show up in accounting data. Topics that are furthest from the list, shown at the top of the table (e.g. personnel records, grievance procedures, and seniority-based promotion), are the least comparable with wages and tend to set rules and assign control rights. The high share of such restrictions is consistent with Rajan and Zingales’s (1998) point that the allocation of decision rights *within* a firm can increase investment incentives, and hence firm performance.

### D.3 Similarity to Wage-Like Benefits

The fourth column of Table 3 presents an alternative approach based on the similarity of clauses to wage-like benefits in embedding space. We start with the codebook from the U.S. Bureau of Labor Statistics’ National Compensation Survey. That codebook provides a detailed list of employment benefits that impose a quantifiable cost to employers, that is, they are priced. We extract and parse this list of priced benefits,

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<sup>40</sup>The full prompt is: “You are a helpful legal assistant. You will now be given some example clauses, and then read individual clauses from collective bargaining agreements. For each clause, please rate: “On a scale of 0-10, how substitutable is this clause with wages and monetary compensation, i.e., does the clause provide benefits that can be expressed or valued in monetary terms, similar to wages?” Scale: 0 = The clause has no connection to monetary compensation or benefits that can be valued in money. 10 = The clause directly specifies monetary amounts, rates, or entitlements that can be fully expressed in dollar values (e.g., wages, bonuses, allowances, paid leave, insurance benefits). Scores between 1 and 9 indicate increasing degrees of monetary-value substitutability. Here are some examples of priced-benefit clauses that would score high on the scale: commission, bonus, piece rate, incentive pay, overtime pay, cost-of-living allowance, uniform or tool allowance, free or subsidized room and board, life insurance, health insurance, disability insurance, retirement benefits. Examples that would score low on the scale: grievance procedure, seniority rules, termination rules, hiring rules, scheduling rules, right to home office. Now rate this clause: Clause: “{clause}”. Provide only a single number from 0 to 10, do not explain your answer.”

<sup>41</sup>We also fine-tune a BERT model to predict wage-equivalence scores across the full corpus. The predictions from the two models yield a clause-level correlation of 0.87.

phrased as they would appear in contracts.<sup>42</sup> Next, we compute the centroid of each topic cluster by averaging the embeddings of all clauses assigned to that topic. Finally, we compute the cosine similarity between each topic-centroid vector and each wage-like clause vector. We define “Sim to Wages” as the average of these cosine-similarity scores across the 20 wage-like clauses. Topics with higher values therefore contain language that is semantically more similar to traditional forms of compensation, while topics with lower values are more distinct from wages and benefits.<sup>43</sup>

## D.4 Frequency and Summary of Topics

The fifth column (“Frequency”) gives the proportion of rights clauses associated with that topic. It indicates that rights clauses are relatively evenly distributed across topics, with the largest topic (“Work Hours”) comprising 6% of the rights clauses, and the smallest topic (“Jury Duty”) containing 1% of the rights clauses. The sixth column gives an LLM-generated summary of the topic. That was produced by providing a random sample of clauses and prompting GPT-4 to summarize the associated rights being provided. We can see that the topics are intuitively related to on-the-job benefits, including holidays, sick leave, and payments, as well as rules around worker control and decision-making, such as scheduling, seniority, and termination. That provides some qualitative support for our text-based measure capturing worker rights and the associated interpretation as comprising both wage-like benefits and assignments of control rights. Appendix E lists the rights clauses associated with each topic which were used to construct the LLM summaries. Even when they are about wage-like benefits, the clauses often reflect limits or conditions on the benefit. Still, because management reserves rights, these conditional clauses tend to expand worker rights rather than limiting them.

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<sup>42</sup>The full list is: incentive-based pay, a commission, a production bonus, a piece rate, a cost-of-living allowance, hazard pay, a uniform allowance, a tool allowance, free room and board, subsidized room and board, paid vacation leave, paid holiday leave, paid sick leave, paid personal leave, overtime pay, shift differential pay, life insurance, health insurance, disability insurance, retirement benefits.

<sup>43</sup>The Spearman correlation between our wage equivalence and wage similarity score is 0.44.

## E List of Worker Rights Clauses by Topic

This appendix provides ten example clauses for each of the topics extracted from worker rights clauses. The topics are listed in the order from Table 3. At the end, the two miscellaneous occupation-specific topics for teachers, which were dropped from the main analysis, are listed. For each topic, we recap the title, wage-equivalence score, wage-similarity score, topic share, and GPT-4 summary. The 10 listed clauses are those used to construct that GPT-4 summary.

1. **Personnel Records** 1.820 0.4550 0.024 The clauses provide workers with the right to access, copy, and be informed about their personal and employment-related documents, including personnel files, job assignments, employment letters, disciplinary documents, and performance reviews.
  - 1. The employee shall be entitled to make a copy of any information contained in their personnel file.
  - 2. ITie employee will be provided with a written confirmation of the information provided Ir&rr to ArtMe ll.IJ
  - 3. For call-outs, Employees will be informed of the specific job(s) to be performed when called by the Company.
  - 4. A Teacher shall be entitled upon request, to copies of materials contained in his/her personnel file.
  - 5. On written request the employee shall be provided with a copy of any such personal material.
  - 6. Employees shall receive a letter of employment which will include the Employee's: a) b) c)
  - 7. An employee shall be given a copy of any such document placed on the employee's file which might be the basis of disciplinary action.
  - 8. Immediate Supervisor" means that person from whom an Employee normally receives her work assignments.
  - 9. In the event that a written report is required by the employee, the employee will be given a copy of any written complaint while protecting the identity of the complainant.

- 10. 26.01 Employee Performance Review When a formal review of an employee's performance is made, the employee concerned shall be given an opportunity to discuss, sign and make written comments on the review form in question and the employee is to receive a signed copy to indicate that its contents have been read.

2. **Grievance & Discipline** 1.905 0.4111 0.031 The clauses provide workers with rights related to disciplinary actions, grievance procedures, and representation, ensuring transparency, due process, and the ability to challenge or appeal employer decisions.

- 1. More severe disciplines will be purged from the employee's personnel file after twenty-four (24) months if the employee receives no additional disciplinary actions, of a similar nature, during that period.
- 2. in such cases, employees shall be offered an irrevocable choice of either a formal or informal investigation.
- 3. The claim by an employee, other than a probationary employee, that he has been suspended or discharged without just cause may be presented as a grievance within seven (7) calendar days after the employee has been notified of his suspension or discharge and such grievance will be processed in the following manner:
- 4. An employee wishing to dispute any such entry shall be entitled to recourse through the grievance procedure.
- 5. If the complaint affects the rate of pay of an employee, the Department Steward shall be informed.
- 6. If the Employer representative is unable to meet the Steward during the Steward's normal working hours, the Steward shall be paid for all the time spent during the processing of the grievances with the Employer on the Employer's property or at any other place which is mutually agreed upon by both the Union and the Employer.
- 7. If no written decision has been given to an employee at Step No. 1 within the time limits specified above, the grievance will be settled in favour of the grievor provided that such settlement shall not prejudice any future



such complaint or grievance, or the employee shall be entitled to submit the grievance to the next stage including arbitration.

- 8. The names of the Grievance Committee, Chairman and Stewards, or where absent a substitute, from time to time selected shall be given to the Home in writing and the Home shall not be required to recognize any steward until it has been notified in writing by the Union of the name of same.
- 9. The employee and the Union will be given a copy of any warning, reprimand, suspension or disciplinary layoff entered on any employee's personnel record, within two (2) working days of the alleged violation becoming known to the Company.
- 10. 5.1 A newly hired employee shall be informed in writing whether his or her position is within the bargaining unit, the name and address of the bargaining agent and the name and work location of the local Union steward which shall be provided as per Article 22.5.4 (Grievance Procedure).

**3. Seniority & Promotion/Transfer** 2.172 0.4671 0.03 The clauses are granting workers rights related to job preference, promotion, and transfer based on seniority, qualifications, and experience.

- 1. Such employees will be given preference in the hiring process.
- 2. The most qualified employee, as determined by the Employer, shall be selected.
- 3. In transfers from one job classification to another, senior employees shall receive first consideration.
- 4. An employee who is bypassed in favour of an employee with less seniority to fill vacant job, shall be notified in writing as to the reason@)
- 5. When less than 1/4 of the department manpower is needed, senior employees from the above mentioned departments who request work, will be given the opportunity to work if they have the skill and ability to perform the job.
- 6. The experience, not treated as classification seniority, the employee has received in the position he/

- 7. In departments other than the Trucking Department, in the event of shift changes of more than two hours, senior employees within the classification and within the department shall be given shift preference.
  - 8. 11.03 Employees shall be selected for positions under Article .O1
  - 9. The employee, where appointed, will be given assistance and instruction in the higher rated job.
  - 10. Such employee will be given a seniority date on the full time employees' seniority list, which will reflect the amount of his full time seniority determined in accordance with the foregoing formula.
4. **Recall** 2.251 0.4373 0.032 The clauses provide rights related to job security and recall for workers who have been laid off, including options to accept vacant positions, refuse temporary recalls without penalty, and priority for rehiring in their former or equivalent positions if they become available.
- 1. Employees who are laid off will be entitled to recall to classifications in their OGL for a period of three (3) years from the date of his/her layoff.
  - 2. When an Employee has been given notice of lay-off, the Employee has the option of: a) Accepting a vacant position, if available, provided the Employee meets the minimum requirements to perform the position.
  - 3. An employee who has been recalled to such temporary vacancy shall not be required to accept such recall and may instead remain on lay-off.
  - 4. Whenever it becomes necessary to reduce the work force, the employee affected shall be given
  - 5. Tradesmen not working at their trade and all other employees involved will receive the established shutdown rate.
  - 6. An employee who has been recalled to such temporary vacancy shall not be required to accept such recall and may instead remain on layoff.
  - 7. An employee recalled to work in a different classification from which she was laid off, or an employee who has displaced an employee in a lower or identical paying classification shall be entitled to return to the position she held prior to the layoff should it become vacant within six (6) months

of the layoff, provided that the employee remains qualified and able to perform the duties of her former position.

- 8. No new employees shall be hired until all those laid off have been given an opportunity to return to work and have failed to do so, in accordance with the loss of seniority provision, or have been found unable to perform the work available.
- 9. An Owner/Operator who receives a notice of lay-off (a)
- 10. a full-time employee who has displaced a part-time employee shall be entitled to return to the position he held prior to the layoff should it become vacant within twenty-four (24) months of the layoff, provided that the employee remains qualified and able to perform the duties of his former position.

5. **Job Security** 2.889 0.4567 0.03 The clauses provide workers with rights related to job security and stability, including provisions for notification and options in the event of workforce adjustments, opportunities for training or retraining, recall rights for seasonal or displaced employees, and protections for seniority and pay rate in cases of job changes or redundancies.

- 1. If the position is affected by a workforce adjustment, the employee will be notified and provided with an opportunity to exercise her options under Article 34 unless otherwise agreed by the parties.
- 2. Where a nurse receives training under this provision, she or he need not be considered for any further vacancies for a period of six (6) months from the date she or he is placed in the position.
- 3. 36.7 Recall Subject to the establishment of labour requirements for the following season, seasonal employees will be offered seasonal employment for the subsequent work season by the employer.
- 4. Such reinstatement or placement will be without loss of seniority and at not less than the same rate of pay to which the employee would be entitled had she remained in her former position.
- 5. Any employee who is declared redundant to a work location shall be given the option of transferring to the first available position of equal classification or be demoted to the next lower classification.

- 6. The nurse shall be reinstated to her former position unless the position has been discontinued in which case she shall be given a comparable job.
- 7. An employee who is displaced by technological change or mechanization shall be given the opportunity to fill another vacancy if capable of doing so and according to seniority or be given a period of training sufficient to perfect or acquire the skills necessitated by the new methods of operation.
- 8. If an Employee has moved into an area to work on a project and his employment has been terminated, and such Employee does not remain in the area sixty (60) days after termination to qualify as a local resident, and such Employee is hired by the aforementioned Employer or a new Employer, such Employee shall be treated as a non-resident for all purposes and conditions of this Agreement.
- 9. b) Employees with recall-reinstatement rights will be offered the position in accordance with Article 79.02 c)
- 10. Such regularly assigned employees shall be protected by guarantee providing they take up their new assignment within the first cycle of operation of the run of their choice commencing from the date of selection.

6. **Notice Requirements** 2.997 0.43995 0.027 The clauses provide workers with rights to receive advance notice regarding absences, layoffs, job vacancies, shut-downs, and meetings, ensuring they have adequate time to prepare for changes in their employment status or work conditions.

- 1. Where possible, the Employer will be provided with two weeks notice of such absences.
- 2. he/she shall be paid schedule wages for the time in excess of 10 days whatever the decision might be.
- 3. Written notice of the proposed shutdown shall be given to the Union not later than two (2) weeks in advance of the shutdown date, in the event an Employee is included in the shutdown, the employee will be paid his accumulated Vacation Pay, if any in the accrued amount to the end of the pay period immediately proceeding the shutdown.
- 4. Unlicensed personnel will receive a notice of seventy-two (72) hours prior to joining the ship unless exceptional circumstances arise.

- 5. Each employee who applies for a posted vacancy during the seven (7) day posting period will be notified in writing of the disposition of her application.
- 6. Employees in these categories will receive twenty-four (24) hours written notice of lay- off).
- 7. Where practical, the employee shall receive a minimum of one (1) day's notice of such a meeting and shall be informed of the reason for it.
- 8. Employees with ten (10) years continuous service, shall receive forty (40) working days notice.
- 9. Such employees for whom no employment is available will be given at least thirty (30) days notice of separation.
- 10. In the event of a permanent layoff as defined in the Employment Standards Act, all employees to be laid-off will be given at least eight (8) weeks notice of lay-off.

7. **Probation Period** 3.491 0.4371 0.015 The clauses provide rights related to the recognition and crediting of probationary periods for employees, including extensions, credit for previous service, and exemptions from additional probationary periods for certain transfers or promotions.

- 1. It is mutually agreed between the parties that the probationary period may be extended a further period not exceeding three (3) months and in such event the employee and the Union shall be notified in writing of such extension.
- 2. Following successful completion of the employee's probationary period, the employee shall be placed on the seniority list and will be credited with seniority at the date of hiring in the Caretaking and Maintenance Department (prorated for under twenty (20) hours per week) and the employee will be notified in writing of the employee's change of status.
- 3. a nurse who has been transferred to the Hospital and who has not completed her or his probationary period at the Hospital where she or he was formerly employed shall receive credit for her or his service during such probationary period, and shall complete the balance of the probationary period required by this agreement.

- 4. A nurse who transfers from casual part-time or full-time to regular part-time status shall not be required to serve a probationary period where such nurse has previously completed one since her or his date of last hire.
  - 5. (b) A nurse who transfers from casual or regular part-time to full-time status shall not be required to serve a probationary period where such nurse has previously completed one since her or his date of last hire.
  - 6. 12.01 Probationary Period Probationary periods are outlined in Appendices E, K, L and M. 12.02 Coverage Under the Collective Agreement During the Probationary Period During the probationary period provided for in Clause 12.01, an employee is entitled to the advantages provided for in the present Collective Agreement, except as otherwise provided.
  - 7. During the probationary period, employees shall be entitled to all rights and privileges of this Agreement, except with respect to discharge and annual vacation which may be taken during the probationary period with the approval of the Employer and which would result in an extension of the probationary period in time equal to that taken in annual vacation.
  - 8. A nurse who transfers from casual or regular part-time to full-time status shall not be required to serve a probationary period where such nurse has previously completed one since her or his date of last hire.
  - 9. Service Letter: At the termination of employment, employees who have completed their probationary period will be given a letter, upon request, showing his term of service and capacity in which employed.
  - 10. A temporary full-time employee entering a full-time permanent position will not be required to serve a probationary period provided the employee held and worked in the identical full-time temporary position for at least twelve (12) months immediately prior to entering the full-time permanent position.
8. **Workplace Safety** 3.573 0.6239 0.054 The clauses provide workers with rights related to workplace safety, health protection, and training and union engagement on safety procedures.
- 1. It has been agreed that employees handling hazardous material shall be supplied by the Company with all necessary equipment (rubber clothing,

goggles, etc.) to protect the employee's person.

- 2. All temporary and part-time employees will be hired as Material Processors.
- 3. ( e ) Employees whose services are terminated because of automation or technological change, shall receive a separation allowance in accordance with the scale outlined in Article 23 of the Agreement.
- 4. The newly-hired employee shall be trained and instructed in the area in which assigned work, on aU safety and health procedures related to his job and his safety responsibility to himself and fellow workers, and wiU be introduced to the Union Safety and Health Committee member in his department.
- 5. Once every second month, employees may be given the opportunity to meet and discuss Union matters in a room provided by the Employer on the Employer's premises.
- 6. Employees shall be entitled to apply for enrolment in the Medical Services Plan.
- 7. The parties acknowledge that newly hired employees will be trained and instructed on health and safety matters relating to the job and their responsibility to themselves, their fellow employees and to the Employer.
- 8. In no event shall any employee be entitled to more than ten (10)
- 9. All employees shall be covered by The Workplace Health and Safety Compensation Act.
- 10. (b) upon request, and with the approval of the Employer, the employee may be granted: (i)

9. **Leaves of Absence** 4.162 0.5159 0.039 The clauses provide workers with the right to take leaves of absence for union activities, public service, education, retraining, and other approved reasons, with varying conditions regarding pay and benefits.

- 1. If an employee is elected or appointed as an official delegate to attend conventions or business meetings in connection with the affairs of the Union, he shall, on giving the Co-operative at least seven (7) calendar days'

notice, be granted such leave of absence without pay as may be necessary to enable him to attend such meetings or conventions.

- 2. Any employee who is elected to a full-time municipal, provincial or federal government office shall be granted a leave of absence in order to allow him to fulfill his elected duties.
- 3. An employee on such leave shall receive the pay and benefits provided in this Agreement.
- 4. 15.02 Education -Leave (a) If required by the Employer, an employee shall be entitled to leave of absence with pay and without loss of seniority and benefits to write examinations to upgrade his or her employment qualifications.
- 5. The public service leave described in Article 15.02(2) will be either with or without pay depending on the following circumstances: (a) where the Employee receives an honorarium for the public service that is equal to or greater than the Daily Rate of Pay, public service leave is granted without pay;
- 6. Apart from any on-the-job training offered by the Hospital, any employee subject to layoff Who may require a leave of absence to undertake retraining in accordance with the foregoing shall be granted an unpaid leave of absence which shall not exceed six (6) months.
- 7. Employees residing within these limits shall be entitled to a mutually agreed leave of absence at no cost to the Employer of five (5) or seven (7) days to be arranged between the employee and the Employer subject to the same qualifiers provided in the periodic or turn-around clauses.
- 8. The employee shall be notified when the leave is approved whether such allowances are to be continued in whole or in part.
- 9. An employee who is selected as a dele- Leave of absence may be granted for good reason.
- 10. An employee who is elected or selected for a full time position with the union or any body with which the union is affiliated, shall be granted leave of absence without loss of seniority for a period of one year.



10. **Breaks** 4.512 0.4523 0.013 The clauses are granting workers the right to paid rest and wash breaks during their work shifts.

- 1. All employees shall be granted five (5) minutes wash time without loss of pay at the end of a regular work day.
- 2. Employees will be entitled to a rest break of not more than fifteen ( 15) minutes during each half day worked.
- 3. 24.10 Employees will be given one fifteen (15) rest period for the first four (4) hours scheduled to work, and worked.
- 4. Each employee shall receive 2 work breaks of 15 minutes in each day's work
- 5. The employee shall be entitled to a fifteen (15) minutes rest period in the morning and in the afternoon.
- 6. An employee shall receive a 15 (fifteen1 minute rest period during eath half of a full eight (8) hour working day.
- 7. Employees will be entitled to a fifteen (15) minute break in the first half of their a) shift and a fifteen (15 ) minute break in the second half of their shift without loss of pay.
- 8. Part-time employees shall be entitled to a paid, rest period of fifteen (15) minutes for each three and three-quarters (3 and 3/4) hours of work during their shift at a time to be determined by the Employer.
- 9. Any employee shall be entitled t o one (1) break of fifteen (1 5) minutes during both the first half and second half of any shift and where practical, during each t w o (2) hour period of overtime excepting during that period where a meal period is provided under Section 1 above.
- 10. Part-time employees shall be entitled to a paid rest period of fifteen (15) minutes for each three and three-quarters (3 3/4) hours of work during their shift.

11. **Parental Leave** 4.590 0.4082 0.027 The clauses provide rights related to maternity and parental leave, including paid and unpaid leave, allowances, and special considerations for employees who are pregnant or adopting a child.

- 1. After completion of 6 months continuous employment, an employee who provides the Employer with proof that she has applied for and is in receipt of unemployment insurance benefits pursuant to Section 18, Unemployment Insurance Act, shall be paid a maternity leave allowance in accordance with the Supplementary Unemployment Benefit Plan.
- 2. An employee who adopts a child under the laws of the province or becomes the natural parent of a child is entitled to parental leave to a maximum of 37 continuous weeks in the event that: 9.6(g) (i)
- 3. a pregnant employee takes a Maternity Leave to which she is entitled pursuant to the Employment Standards Act, and Sec.
- 4. the CFO transitional allowance, for each week of the waiting period, less any other monies earned during this period; and (ii) for each week that the employee receives a maternity benefit under Employment Insurance or the Québec Parental Insurance Plan, she is eligible to receive the difference between ninety-three percent (93%) of her weekly rate of pay and, where applicable, the CFO transitional allowance, and the maternity benefit, less any other monies earned during this period which may result in a decrease in her maternity benefit to which she would have been eligible if no extra monies had been earned during this period.
- 5. On the occasion of the birth of his child, a male Nurse shall be granted, on request, special leave with pay to a maximum of one (1) day during the confinement of his spouse.
- 6. An Employee who has completed her probationary period shall, upon written request, be granted leave without pay for up to twelve (12) months as necessary for the purpose of adopting a child.
- 7. An employee who is pregnant and has completed six (6) months or more consecutive service shall be entitled to maternity leave without pay for a period not to exceed fifteen (15) weeks.
- 8. An employee who chooses not to take parental leave is entitled to a Day off with pay when their child is born or adopted, provided they were scheduled to work that day.
- 9. An employee who becomes pregnant shall, upon request, be granted maternity leave without pay for a period beginning before, on or after the

termination date of pregnancy and ending not later than twenty-seven (27) weeks after the termination date of pregnancy, subject to the Paternity Leave Without Pay clause 17.09.

- 10. Employees who are pregnant shall not be required to operate VDTs.

12. **Scheduling** 5.329 0.5357 0.03 The clauses provide workers with rights related to scheduling flexibility, compensation for working during non-standard hours or days off, and benefits during absences or layoffs.

- 1. shall be applied only to absences on the employee's regularly scheduled workdays and shall not be applied to any days for which the employee is receiving Weekly Indemnity benefits.
- 2. If a Retail Store employee voluntarily elects to work on their regular day off in the week in which a closure is observed, the employee shall be paid at straight time for hours worked on that day
- 3. Where possible, an employee will not be required to continue at work through his regular
- 4. an employee is entitled to one (1) working day including the day of the funeral; e) In the case of paragraphs a), b), c) and d)
- 5. He will not be required to report for work until the end of the eight (8) hours rest period.
- 6. Where possible, employees will be given opportunities to select their work periods from among the established work schedules for their respective departments.
- 7. An employee who works a scheduled tour any period of which falls between midnight Saturday and midnight Sunday shall be paid Sunday Premium Pay.
- 8. These requirements will be considered to have been met for any week for which the Employee receives a Federal Unemployment Benefit.
- 9. On Vancouver Island, employees working outside their local area on the night shift shall not be required to work the day shift on the following day.
- 10. An eligible employee entitled to a partial automatic short week benefit with respect to certain hours of layoff not included in an Unemployment

Insurance System week of unemployment, as provided in Section 3(a)(5) of Article 1, will receive an amount computed as provided in subsection 2(a) above, based on the number by which the hours for which the employee would regularly have been compensated exceeds his/her compensated or available hours, with respect to the days within the work week not included in such Unemployment Insurance System week of unemployment.

13. **Meals** 5.763 0.4834 0.015 The clauses are granting workers rights related to receiving meal allowances, paid or unpaid meal breaks, and compensation related to meal times during or adjacent to their work shifts.

- 1. An employee required to work overtime for a period in excess of two hours immediately following his or her regular hours of work shall be granted \$8.00 as lunch money provided
- 2. The time at which employees are granted unpaid meal periods shall be determined by the Department Head.
- 3. 5.16 Employees who work one and one-half (1-1/2) or more hours overtime before their regular starting time or after their regular quitting time shall be paid a lunch allowance of nine dollars (\$9.00) in cash.
- 4. the employee shall be entitled to a meal at the small options facility at the Employer's expense.
- 5. An employee working 3 hours or more after their regular shift shall be given a meal allowance and every 4 hours thereafter.
- 6. Each employee shall be given a paid twenty (20) minute lunch break at the completion of the regular shift hour to consume such meal.
- 7. A day employee who, without prior notice given before the beginning of his shift, is required to work during the normal lunch hour will be provided with a lunch ticket.
- 8. Employees are also entitled to one (1) unpaid meal break of one-half (1/2) hour on each regularly scheduled day of work.
- 9. If a full course meal cannot be supplied, then the employees will receive one-half (1/2) hour's pay at the applicable overtime rate.

- 10. The employee upon reporting after the meal break shall receive a minimum of two (2) hours pay at the rate applicable.

14. **Part-Time Employment** 5.787 0.4890 0.023 The clauses are providing rights related to compensation, work hours, seniority, and benefits for part-time employees.

- 1. For ‘the purposes of the rate progression scale, a 9 part-time employee will receive credit for a week of service ” fi when he works his scheduled hours in any week.
- 2. Eligible part-time employees shall be compensated as follows:
- 3. Part-Time Employees who report to work for any shift will be guaranteed at least four (4) hours of work, or if no work is available, will be paid at least four (4) hours.
- 4. An employee who has elected to work part-time shall be entitled to a pro-rated gratuity based on the proportion of time the employee works relative to full-time employment.
- 5. In the event any full-time employee exercises his right under Section 21.04 and moves to another classification or moves to another department, said employee shall be given the 2,501-hour level for the first eight (8) weeks (300 hours), the 3,001-hour level for the next eight (8) weeks (300 hours) and the top rate thereafter in that classification.
- 6. 58.04 Part-time employees shall be paid at the hourly rate of pay for all work performed up to seven decimal five (7.5) hours in a day or thirty-seven decimal five (37.5) hours in a week.
- 7. The employee will be given credit in his seniority for his continuous service and will be entitled to the app licabl e part time rate of pay.
- 8. Regular part-time employees in a probationary period shall receive 12% in lieu of all benefits including annual vacations, general holidays and sick leave.
- 9. A part-time nurse who changes status to full-time will be given seniority credit on the basis of fourteen hundred (1400) paid hours of part-time service being equivalent to one (1) year of fulltime service and vice versa.

- 10. 4.2.1 Part-time employees shall be paid on the salary scale of the group to which they are assigned and progression shall occur at 1040 or 2080 (which ever is applicable)
15. **Sick Leave** 5.923 0.5090 0.025 The clauses provide workers with rights related to receiving pay or benefits during periods of illness, injury, or medical leave, ensuring financial stability during times they are unable to work due to health reasons.
- 1. 8.1 1 All time absent (up to thirty-one 1311 days) because of sickness or off-the-job accidents, and all time absent because of on-the-job accidents, shall be considered as time worked for the purposes of determining vacation pay to which full-time employees are entitled.
  - 2. Where the processing of an employee's claim for LTD benefits has been delayed beyond the 120 day elimination period and the employee is in no way responsible for the delay, the Board will continue to pay the employee out of hidher accumulated sick leave credits until the employee receives benefits from the LTD Plan.
  - 3. An Employee employed by the Thames Valley District School Board on 1998 June 30 shall be entitled to have credited to the Employee's account any sick days accumulated with a predecessor Board on or before 1998 June 30.
  - 4. The employee shall be entitled on a biweekly basis, to utilize accrued sick credits in units of half days in order to supplement his or her rate of pay in the alternate position; but the combination of sick pay supplement and rate of pay in the alternate position shall not exceed the regular rate of pay in his or her former position.
  - 5. Part-time employees shall be paid 100% of their regular salary (as per their full-time equivalent status) for up to eleven ( 11) days of absence due to illness.
  - 6. An employee is entitled to sick leave with pay when he/she is unable to perform his /her duties because of illness or injury, provided that: (a)
  - 7. Where, in respect of any period of compensatory leave, an employee is granted sick leave with pay on production of a medical certificate,

- 8. Employees who have been properly appointed to permanent positions in accordance with this Agreement shall be entitled to payment for absence from work due to sickness to the extent they have established sick leave credits under 11.1, hereof.
- 9. An employee shall earn sick leave credits at the rate of 8.
- 10. Where, in respect of any period of vacation leave, an employee is granted sick leave with pay, on production of a medical certificate, the sick leave granted shall be substituted for vacation leave.

16. **Bereavement Leave** 6.216 0.4002 0.028 The clauses provide workers with bereavement leave, allowing them time off, often with pay, to grieve and attend funerals following the death of a close relative or family member.

- 1. A part-time employee shall be granted bereavement leave in accordance with Article
- 2. In the event the funeral is held on an employee's regular work day other than the three (3) days immediately following the day of death, the employee will be granted upon request, leave on that day to attend the funeral.
- 3. An employee who has not completed three (3) consecutive months of continuous employment shall be granted bereavement leave without pay on any of the scheduled working days that occur during the three (3) days immediately following the day of the death of a close relative.
- 4. a full time employee will be granted one (1) days leave of absence with pay to attend the funeral.
- 5. Bereavement Leave Employees shall be granted up to five ( 5 ) working days for absence occasioned by the death of a relative.
- 6. An employee shall be granted up to five (5) regularly scheduled consecutive work days' leave without loss of salary or wages in the case of death or serious illness in the immediate family, defined as spouse, child, mother, father, brother, sister, mother-in-law, father-in-law, grandmother, grandfather, step-parent, step-child, grandchild, court appointed ward, court appointed guardian.

- 7. Teachers shall be granted compassionate leave with pay in the event of the death or serious illness of spouse, mother, father, brother, sister, son, daughter, step-parent, stepchild, parent-in-law, brother-in-law, sister-in-law, son-in-law, daughter-in-law, grandparent, grandchild, aunt, uncle, niece and nephew and a maximum of one day leave with pay will be granted to attend the funeral of the grandparent, grandchild, niece or nephew of the teacher's spouse.
- 8. 12.04 – Bereavement Leave Any employee who notifies the Hospital as soon as possible following a bereavement will be granted bereavement leave for three (3) consecutive working days off without loss of regular pay from regularly scheduled hours, in conjunction with the death of the spouse, child, parent, sister, brother, mother-in-law, father-in-law, grandparent, grandchild, brother-in-law, sister-in-law or grandparent of spouse.
- 9. Employee would be paid bereavement leave for Wednesday and Thursday.
- 10. Upon the death of a nurse's mother-in-law, father-in-law, brother, sister, brother-in-law, legal guardian, grandparent, sister-in-law, grandchildren, son-in-law or daughter-in-law, a nurse shall be granted up to three ( 3 ) continuous calendar days without loss of pay.

17. **Workplace Injuries** 6.690 0.5412 0.024 The clauses provide workers with rights to compensation and benefits in cases of injury, illness, or accidents occurring in the course of employment, including coverage for lost wages, protection against costs for damaged equipment, and provisions for receiving full or partial pay under specific conditions.

- 1. He shall be reimbursed for all lost time and benefits if reimbursement is part of the judgment.
- 2. An employee prevented from performing their regular work with the Employer on account of an occupational accident that is recognized by the Worksafe BC as compensable within the meaning of the Act, shall receive from the Employer the net pay an employee would receive while at work.
- 3. An employee who becomes sick or injured while on assignment away



from home base will receive his normal basic home base salary until compensation liability has been established.

- 4. Unless willful negligence is established, employees shall not be required to pay for lost, broken or otherwisdamaged equipment.
- 5. An employee shall be granted Workers' Compensation leave with net pay in the event that the Workers' Compensation Board determines that the employee has established a claim (time loss benefits) and they are unable to perform their duties by reason of the compensable injury which occurred while employed by the Employer.
- 6. An employee who is injured while at work and is sent home for the balance of the shift by his Supervisor shall be paid for the balance of the shift on which the injury occurred.
- 7. If such employee is required to deal wltth matters arlsng out Of thls Agreement, up to but not Including matters arlsng from any arbltration proceedng, durlng a shlft for whch he was scheduled to work, the employee willl be compensated by the Employer to the extent of hls regular pay for such tlme.
- 8. A disabled employee may earn from employment, other than employment with The City or'any of its Associated Boards, Commissions, Authorities or Agencies, up to twenty percent (20%) of his annual full pay without any reduction in the employee's full pay but any monies earned by the employee from such employment in excess thereof shall be deducted from the employee's full pay.
- 9. the employee receives benefits from the As of the slxty-first (61et) day of a disability, the employee considered eligible for disability benefits under federal or provinclal law, wltth the exception of the Employment Insurance Act, must, at the board's written request along with the appropriate forms, make lthe request and accept any obligations arising there from.
- 10. he would have received full base pay pursuant to the relevant article, but such payments will not reduce his/her general illness entitlement for that year.

18. **Termination** 6.799 0.4988 0.026 The clauses are providing workers with rights

to various forms of compensation upon termination of employment, including severance pay, payment for unused vacation, and other forms of separation payments.

- 1. On termination of employment, except for termination for just cause, a permanent employee who is entitled to an immediate annuity or an immediate annual allowance under the Public Service Superannuation Act, shall be paid severance pay equal to the product obtained by multiplying his/her weekly rate of pay on termination of employment by the number of completed years of continuous employment less any period in respect of which he/she was granted severance pay.
- 2. less any period in respect of which the employee was granted severance pay under 46.01(a)(i).
- 3. For example, an employee who terminates after accumulating five (5) weeks' service in the year would be entitled to 5/20ths of three days.
- 4. Eligible Employees will be entitled to receive Separation Payment at their regular rate of pay according to the attached schedule.
- 5. An employee whose employment is terminated for any reason shall be paid with his final pay an amount of money equivalent to any vacation which may have accrued to his benefit in accordance with Article 26.02.
- 6. The employee may be given equivalent pay in lieu of written notice.
- 7. Upon dismissal for any reason other than for gross misconduct or for self-provoked dismissal for the purpose of collecting severance pay, an employee shall receive cash severance pay in a lump sum equal to one week's pay for every 5 months continuous service or major fraction thereof up to a maximum of 52 weeks' pay:
- 8. When an employee dies or otherwise ceases to be employed, he or his estate shall be paid an amount equal to the product obtained by multiplying the number of days of earned but unused vacation with pay to his credit by the daily rate of pay as calculated from the classification prescribed in his certificate of appointment on the date of the termination of his employment.

- 9. Established employees shall be paid Severance Pay in accordance with the Canada Labour Code.
  - 10. Long-Term Maintenance employees who are assigned work on a major plant shutdown will be paid Short-Term Maintenance rates and overtime conditions during the period of the major shutdown.
19. **Vacations** 6.810 0.5398 0.045 The clauses are granting workers rights related to vacation entitlements, including the timing, duration, and pay during their vacation periods.
- 1. As far as possible, Regular Full-time Employees shall be granted their choice of vacation periods; however, the final allotment of vacation remains within the responsibility and authority of the Employer.
  - 2. Regular full time employees with less than one (1) year of employment shall receive vacation pay in accordance with the regulations established under the Canada Labour Standards Code as of July 1965 or any subsequent amendment thereto.
  - 3. Where military leave is approved an employee shall not be required to forfeit any of his vacation entitlements.
  - 4. Where military leave is approved an Employee shall not be required to forfeit any of his/her vacation entitlements.
  - 5. This amount multiplied by the number of days to which an employee is entitled will represent the total value of an employee's vacation pay.
  - 6. An employee is entitled to vacation leave to the extent of the employee's earned credits.
  - 7. All other employees who leave the service shall be entitled to vacation in accordance with the appropriate clauses in this Section.
  - 8. (d) Employees who are in their seventeenth (17th) anniversary year shall be granted five (5) weeks vacation with pay.
  - 9. The basic intent is to ensure that an employee receives his earned vacation where, because of a bonafide medical reason this may not have been possible.

- 10. An operating employee covered by paragraph 22.3 hereof will be entitled to vacation on the basis outlined therein if on his or her fourth or subsequent service anniversary date
20. **Holiday Pay** 6.812 0.5064 0.037 The clauses provide workers with rights to paid holidays, additional compensation for working on holidays, and adjustments to vacation schedules or pay in the event a holiday falls during their vacation period.
- 1. All qualifying employees who have completed their probationary period will be entitled to the following paid holidays:
  - 2. Starting January 1” 2003, an employee required to work on the following public holidays and for which he is qualified for in accordance with clause 11.2 : New Year’s Day Good Friday Victoria Day Christmas Day Canada Day Labour Day Thanksgiving Day Boxing Day shall receive one and one-half (1 %) times
  - 3. In addition to the provision contained in Article 10.2(a), an employee who works on a Statutory Holiday; shall be entitled to a day off with pay or straight time
  - 4. An employee who qualifies for such Statutory Holiday on the day it occurs, and works on that day, will be paid for the Statutory Holiday at straight-time rates.
  - 5. In addition, if an employee is eligible to receive pay under this clause for Christmas Day, he shall also be paid for Boxing Day and New Year’s Day.
  - 6. If such service occurs within a payroll period which includes a holiday, he shall receive holiday pay.
  - 7. Where an employee receives three (3) or more weeks’ vacation with pay and a statutory holiday occurs during the employee’s paid vacation, an extra day’s pay may be given in lieu of an extra day’s vacation with pay if, in the opinion of the Employer, an extra day’s vacation with pay will interfere with vacation schedules or hamper operations.
  - 8. Ol All eligible employees shall be entitled to the benefits provided in this Article 18 in respect to the following Statutory Holidays: New

Year's Day Good Friday Easter Monday Victoria Day Canada Day British Columbia Day Labour Day Thanksgiving Day -cey Christmas Day Boxing Day and any additional Statutory Holidays proclaimed or declared by the Government of Canada, the Province of British Columbia or the District of Saanich.

- 9. Friday Victoria Day Dominion Day Civic Holiday Each employee shall be entitled to one additional holiday with pay each year, such holiday to be scheduled by mutual agreement within a period of thirty (30) days before or after the employee's first and subsequent anniversary date of employment with the Hospital.
- 10. If a Holiday under Article 21:01, or a Presidential Day, falls during an employee's vacation period, the employee will not be required to use any vacation credit to cover the holiday.

21. **Jury Duty** 7.356 0.3980 0.009 The clauses provide rights to workers for compensation or pay adjustments when they are required to serve on jury duty or appear in court as witnesses, ensuring they are not financially disadvantaged for fulfilling these civic duties.

- 1. No jury duty pay will be allowed for any day which the employee is entitled to vacation or general holiday pay.
- 2. Any regular full-time employee who is required to report for Jury Duty, Coroner's Inquest, or who is required to appear as a Crown Witness, on a day on which he would normally have worked, will be reimbursed by the Company for the difference between the pay received for Coroner's Inquest, Jury or Witness Duty and his regular straight time hourly rate of pay for his regularly scheduled hours of work necessarily lost.
- 3. An employee when called for jury duty or subpoenaed as a witness shall be paid full salary.
- 4. 17.01 An employee who is selected for service as a juror or subpoenaed as a witness will be compensated for loss of pay from his regularly
- 5. An employee who is summoned for jury duty and is required to lose time from his assignment as a result thereof, shall be paid for actual time lost with a maximum of one basic day's pay at the straight time rate of his

position for each day lost, less the amount allowed him for jury duty for each such day excluding allowances paid by the court for meals, lodging or transportation, subject to the following requirements and limitations: (i)

- 6. 12.01 Each seniority employee who is summoned to and reports for jury duty, or as a court witness, as prescribed by applicable law (subject to the eligibility requirements in (a), (b), and (c)), shall be paid by the Company the difference between the employee's regular base rate, exclusive of premiums, for the number of hours up to eight (8), regardless of shift that he otherwise would have been scheduled to work: and the daily jury fee paid by the Court (not including travelling allowance or reimbursement of expenses).
- 7. The 14.14 Appearance in Court An employee summoned to appear or required to ~rve jury duty, or one who has been served with a subpoena to appear aS a witness, shall be paid the difference between what he would have earned for his scheduled hours at his paid rate and the court fee received.
- 8. Any employee will be compensated for time spent as a witness on behalf of the Company to a maximum of the basic work day or basic work week.
- 9. Any regular full-time employee who is required to perform Jury Duty, or who is subpoenaed to serve as a witness in a Court action or Coroner's Inquest, save and except actions involving the Company or Trade Unions, unless subpoenaed by the Crown, on a day on which he would normally have worked, will be reimbursed by the Company for the difference between the pay received for such duty and his regular straight time hourly rate of pay for his regularly scheduled hours of work.
- 10. No employee shall be entitled to receive such pay where the employee is summoned to give evidence in any civil litigation to which the City is not a Party, or where the employee is summoned to give evidence in a criminal case, or when the employee is the person charged in any court, unless such criminal case arises out of actions by the employee in the course of their employment.

22. **Seniority-Based Vacation** 7.436 0.4908 0.038 The clauses are granting workers vacation benefits and time off based on their length of service and seniority.

- 1. After completing twenty-two (22) years continuous service with the Corporation, each employee shall be entitled to six (6) weeks of vacation, with vacation pay computed at twelve (12) percent of gross annual earnings.
- 2. Where an employee leaves the Regular Service prior to the completion of six (6) months service as computed in accordance with Article 72.7, he or she is entitled to vacation pay at the rate of four percent (4%) of total earnings paid during the period of his or her employment.
- 3. An employee who has completed twenty-five (25) years of service as of December 31 shall receive 217.5 work hours of vacation.
- 4. A mar employee who has worked a minimum of fifteen hundred (1500) hours in a calendar year shall be entitled to maximum vacation pay benefits as spelled out under this article.
- 5. After fifteen years' continuous service ~ four weeks with 10% of gross wages, As far as possible, employees shall be granted their choice of vacation periods according to their seniority.
- 6. Any employee completing nineteen (19) years of service shall receive six ( 6 ) weeks' vacation with pay of twelve percent (12%) of gross earnings.
- 7. After one year of employment, an employee shall be granted two (2) weeks of vacation and the pay shall be based upon four and one-half percent (4½%) of his gross earnings during the applicable vacation year or eighty (80) hours at his regular pay, whichever is greater.
- 8. (b) Employees who have completed twenty (20) years of employment by November 30th in any year shall receive five ( 5 ) weeks vacation with pay; however, if an employee has not completed his twentieth (20th) year of employment when taking his vacation, the pay for the fifth (5th) week shall be delayed until his twentieth (20th) anniversary date of employment.
- 9. During the fifth (5th) and sixth (6th) full vacation years of continuous service: the Employee earns three (3) weeks vacation fifteen (15) days.
- 10. Employees who have accumulated one hundred and twenty (120) days seniority will be granted two (2) floating holidays per year.

23. **Reimbursements** 7.417 0.5326 0.022 The clauses provide workers with rights

to compensation and allowances for time spent and expenses incurred due to work-related travel, delays, and use of personal vehicles for work purposes.

- 1. When the transportation provided by the Employer for the conveyance of Employees is delayed by circumstances beyond the control of the Employees, the Employees shall be paid for all such time, up to a limit of two (2) hours at the Classification Basic Hourly Rate.
- 2. When an employee has been notified prior to leaving his place of residence not to report for work, the two (2) hours reporting time in paragraph (I) shall not apply, If on any project work cannot proceed due to shortage of mataid or other reason within the control of the Company, men living away f h m home will either be returned home (Le,) paid travel expense, travel time & subsistence allowance for travel day out and when requested to retum to job site shall be paid same when returning to work) or at the option of the Employer and with the consent of the employees will be paid three (3) hours and subsistence if applicable for the days that the work is delayed.
- 3. In such a case, employees who use their own vehicles will be paid thirty-five (35) cents per kilometer.
- 4. 3.06.1 Report Time Operators shall be paid the following report time for taking trolley coaches or motor buses out of the garage to operate in regular scheduled service and charter runs:
- 5. A n employee authorized by his Department Head to use his personal automobile in the performance of his duties shall be paid as follows:
- 6. An An Operator performing Tour or Multi-day Charter work requiring expense money will receive an advance from the Company for all reasonable expenses which will be incurred during such trip.
- 7. Employees on out-of-town assignments who require overnight accommodation shall receive in addition to the per diems in Article 12.2.1, first class, single accommodation, equivalent to AAA (American Automobile Association) or CAA (Canadian Automobile Association) standards.
- 8. Such Employee shall be reimbursed for a round trip between the Hospital and his home a t



- 9. Any employee covered by this Collective Agreement, authorized by the Director or designate to travel as part of the job, shall be paid a travelling allowance per kilometre as approved from time to time by the Board.
- 10. When the transportation provided by the Employer for the conveyance of employees is delayed by circumstances beyond the control of the employees, the employees shall be paid for all such time, up to a limit of two (2) hours at the applicable straight time rate.

24. **Seniority-Based Benefits** 7.436 0.5973 0.039 The clauses provide workers with rights related to pro-rated benefits, eligibility for allowances based on employment duration, credit for service and seniority during leaves, cost-sharing for benefits, and entitlements based on continuous service, including adjustments in pay and long-term disability plans.

- 1. Employees eligible to receive this allowance who are not actively employed for the full contract year shall receive a pro-rated amount of 1/12 of benefit amount, for each full month of active employment.
- 2. Each eligible employee who has at least one year of continuous employment as of April 1, 2015, shall be entitled to receive, between July 1, 2016 and March 31 2017,
- 3. For employees appointed prior to December 2, 1997, their anniversary date will be the date on which the employee received his last pay increment.
- 4. Where an employee dies and he would have been entitled to receive a Retirement Allowance, such allowance shall be paid: (a) (b) to his beneficiary; or, to his estate if there is no such beneficiary.
- 5. Each employee will be entitled to one-half (1/2)
- 6. Employees will receive service and seniority credit for all leaves granted under this Article.
- 7. Where an employee is covered for the foregoing benefits, sixty-five per cent (65%) of the costs of providing the benefits shall be borne by the Board and thirty-five per cent (35%) by the employee.
- 8. All Full-Time Employees covered by this Agreement shall be provided with a Long Term Disability Plan, 100% of the cost to be paid by the City.

- 9. Regular employees with six (6) or more years of continuous service as of July 1st are entitled to eighteen
  - 10. (c) Anniversary date refers to the anniversary of the employee's first date of continuous employment and such date shall be designated as the date when an employee may be entitled to move across the pay level to the next increment subject to a satisfactory performance appraisal.
25. **Overtime** 7.714 0.5014 0.026 The clauses provide workers with rights to receive enhanced compensation and specific benefits for working overtime, including higher pay rates for overtime hours, compensation for cancelled overtime, meal reimbursements, and shift change notifications.
- 1. An employee required to work authorized overtime in excess of their regularly scheduled hours on a paid holiday (but not including hours on a subsequent regularly scheduled shift), shall receive and two (2) times her regular straight time hourly rate for such additional authorized overtime.
  - 2. If two or more overtime premiums are applicable to the same hours worked an employee shall receive only the highest overtime premium applicable to such hours, except calculation of overtime for the night shift will include the shift premium to which they are entitled.
  - 3. An employee who is required to work more than two (2) hours of overtime immediately before or following his/her regularly scheduled hours of work, without notification of the requirement to work such overtime prior to the end of his/her previous regularly scheduled shift, shall be reimbursed for the cost of one (1) meal to a maximum of ten dollars (\$10.00).
  - 4. If an employee is asked to work overtime, and agrees to, and the overtime is cancelled within 1 1/2 hours before the end of their regular shift or part way through the overtime period, the employee will receive 2 hours at time and one-half or hours worked on overtime, whichever is greater.
  - 5. Unscheduled overtime shall be defined for the purposes of this section as being overtime for which, the Employee receives no notice thereof until the last regularly scheduled shift which the overtime follows.
  - 6. An employee is entitled to overtime compensation under clause 14.02 and 14.03 for each completed fifteen (15) · minute period of overtime worked

by the employee:

- 7. If it is necessary to change the employees' shift within a day, without having given them at least forty-eight (48) hours notice of the change, they shall be paid the appropriate overtime premium for all hours worked on the first shift so changed.
- 8. The Job Steward shall be offered the opportunity to share in the overtime on the site on which he/she is working.
- 9. Pursuant to Sub-clause 17.03(b) of the Master Agreement, Correctional Service Workers who are assigned to work other than in centres listed in Supplement I of the Master Agreement and who are authorized to work in excess of the normal weekly hours of work shall be compensated at one and one-half (1 1/2) times the Employee's regular salary for all overtime hours worked.
- 10. Notwithstanding the callout minimum, an employee who is at the work place prior to the commencement of the employee's regular shift and who is required to commence work prior to the commencement of the employee's regular shift, shall be paid in accordance with the overtime provisions for the actual time worked prior to the commencement of the employee's regular shift.

26. **Position Classification** 7.723 0.5134 0.036 The clauses are providing workers with rights to receive pay adjustments or increases when they take on duties in higher paying classifications, substitute in higher paying roles, transfer to new positions with higher salary scales, or are temporarily appointed to positions of a higher pay grade.

- 1. If an employee substitutes in a higher paying classification where the salary placement in the salary range is less than the salary they would have received if substituting in a classification between their current classification and the substituting classification, then the salary placement will be equivalent to the higher rate.
- 2. not more than ten (10) cents below the job rate for the occupational classification for which they were hired and will be advanced to the job rate when they produce the normal quantity and quality and their performance

is otherwise satisfactory, and in any event at the end of a period not to exceed six months from the date of hiring.

- 3. The employee will be paid at the new rate of pay that is closest but no less than his or her current rate of pay.
- 4. When an employee receives an increment in the lower rated position the employee's acting rate of pay will, if required, be adjusted accordingly.
- 5. An employee who transfers to a new position such that the minimum of the salary scale of the level of the new position is higher than that of the employee's previous position will be granted a promotional increase equal to the greater of five percent (5%) without exceeding the maximum of the applicable salary scale, or the amount necessary to bring the employee's salary to the minimum of the salary scale for the new position.
- 6. If the employee is receiving an out of line differential prior to the dates (b) specified in Section 1, the rate of pay of such employee shall be increased by the amount by which the rate for Job Class 1 has been increased, as provided in Section 1, and the following shall govern:
- 7. If the employee continues to act in the position for more than one (1) calendar year, they will no longer receive the compensation set out in (a) or (b) above, but will be placed on a step in the range of that classification.
- 8. Temporary Transfer Where an employee is assigned temporarily to perform the duties and assume the responsibilities of a higher paying position in the bargaining unit for a period in excess of one-half of a shift, he shall be paid the rate in the higher salary range immediately above his current rate from the commencement of the shift on which he was assigned the job.
- 9. Effective 2001 September 21, when an employee is temporarily appointed to carry out the duties incident to a position covered by this Agreement which is a higher pay grade than the position which the employee normally holds, the employee shall be paid for each full day the duties of the higher pay grade position are carried out at the minimum rate in the scale for such higher pay grade position except where the salary received in the employee's own position

- 10. If there is no such incremental rate the employee shall receive the next higher incremental rate.

27. **Work Hours** 7.798 0.4866 0.058 The clauses provide workers with rights to guaranteed minimum pay for short-notice work, overtime compensation, pay for additional duties or hours beyond their regular schedule, and specific pay rates for work under certain conditions or times.

- 1. In the event a part-time Employee is called in for extra work and no work is available, that Employee will be paid a minimum of three (3) hours.
- 2. Employees who normally work less than thirty-five (35) hours over five (5) days, shall be compensated at 1.5 times their hourly rate for the first two hours and double their hourly rate after that time for work performed on a sixth or seventh day.
- 3. The employee will be paid for each hour or part hour worked, rounded to the nearest fifteen (15) minutes to the Employer's advantage at the wage rates specified in the Appendix to this agreement.
- 4. If Tour Workers are asked to remain after their shift is scheduled to end, to put on felt, they shall be paid for the time worked plus three (3) hours.
- 5. Employees shall be paid two times' (2x) the Employee's regular hourly rate for time worked in excess of forty eight (48) hours in any work week.
- 6. Where a nurse attends a committee meeting outside of regularly scheduled hours, she or he will be paid for all hours spent in attendance at meetings at her or his regular straight time hourly rate.
- 7. In each instance the employee will be compensated at his single hourly rate not exceeding eight (8) hours for such travelling time in any twenty-four (24) hour period.
- 8. A shift employee working between 1600 to 0800 hours and for all hours worked on a Sunday shall be paid as follows:
- 9. Therefore, the Non-Permanent employee would receive 5.5 hours of statutory pay.

- 10. If an employee is suspended for a day and his shift is more than eight (8) hours, the employee will be given the option of making up the hours in excess of eight (8) on another day in the week of suspension.

28. **Payment Rules** 8.367 0.5911 0.051. The clauses are giving workers rights related to the timing, frequency, and accuracy of their wage payments.

- 1. All personnel employed before the 31st of December 1979 will be paid at the maximum rate indicated in this Schedule for their classification subject to the provisions of note number two (2).
- 2. an employee receives h i s pay cheque, t h e Company s h a l l
- 3. 18.03 Part-time employees shall be paid six (6))
- 4. If, as and when an error occurs in an employee's pay cheque and the amount is equivalent to one (I) day's pay or more, he shall be entitled, on request, to a cheque being issued in favour of such employee as soon as possible and not later than the first (1st) Friday following the pay day on which the error was made for such shortage.
- 5. All employees covered by this Agreement shall be paid on a definite bi-weekly basis, and dates will not be altered without consent of the Union.
- 6. All regular Employees shall be paid twice each working month, on the fifteenth (15th) and last day of the month except where the fifteenth (15th) or last day of the month falls on a nonworking day, in which case pay day shall be the last applicable working day.
- 7. the rate of wages to which the employee is entitled; (iii)
- 8. 5.20.1 Accumulati~on of 'Time The employees will be entitled to bank a maximum of thirty (30) m i n u
- 9. 30)calendar days In any dispute over a pay cheque or pay statement or any matter thereon the time limit shall be calculated from the date the employee received the pay cheque or pay statement.
- 10. Employees will be paid every other Thursday.

29. **Holiday Work Pay** 8.563 0.5143 0.026 The clauses provide workers with enhanced compensation for working on holidays, weekends, or their scheduled days off, including provisions for part-time and temporary employees.

- 1. 10.03 Part-time employees shall receive payment for holidays proportionate to their actual time worked, calculated on the basis of the four (4) calendar weeks preceding the holiday.
- 2. An employee who performs work on a Sunday or second scheduled day off shall be paid at the rate of two (2) times their regular rate of pay, exclusive of premiums.
- 3. For the purpose of pay for work performed on General Holidays, hourly employees including spare board employees will be paid at one and one-half times the hourly rate.
- 4. ) - Double time and one-half for time worked on any days on which any of the designated holidays is observed unless the holiday falls on one of the employee's regularly scheduled days off in which event the employee, in addition to holiday pay under Section (84), will be paid double time for time worked.
- 5. Employees who work on a continuous operations schedule will receive 11.5 straight time hours of pay for holidays, jury duty, and bereavement leave, provided that they meet the specific criteria for each of these provisions already contained within the Agreement.
- 6. In addition to (1) above, Temporary employees shall receive holiday pay, at their basic rate calculated on a pro-rata basis, based on the average number of hours worked per day in the previous thirty (30) calendar days, whether work is performed on the holiday or not;
- 7. If an employee works on any of the holidays listed in Article 32.06 they shall be paid at the rate of two and one-half (2½) times their regular straight time hourly rate for all hours worked on such holiday.
- 8. If an employee works on two (2) consecutive days off, the employee will be paid at the rate of double time (2) for all hours worked on the second consecutive day.
- 9. An employee who does not qualify for holiday pay under paragraph 21.02 for a paid holiday must be paid at least time and one half the employee's regular rate for each hour worked on a recognized holiday as set out in Article 21.01.

- 10. Each full-time employee shall be paid eight (8) hours pay for each such Holiday, following the first thirty (30) days of employment, which is calculated from the first day on payroll.

30. **Shift Premiums** 9.220 0.5088 0.025 The clauses are providing workers with additional compensation for working under specific conditions, such as shift differentials, premium pay for weekends or consecutive shifts, and pay increases for assuming additional responsibilities or working in particular locations.

- 1. Employees shall be paid a shift differential of 40 cents per hour for all hours worked between 7:
- 2. A Full Time nurse will receive premium pay as outlined in the contract for all hours worked on a second consecutive and subsequent consecutive weekend, save and except where: such weekend has been worked by the nurse to satisfy specific days off requested by such nurse; or
- 3. If the employee works three decimal seven five (3.75) hours or more he or she shall be paid the full premium for the day and his or her normal daily rate of pay.
- 4. Where, an employee's shift schedule is changed by the Company, the affected employee will be paid at the rate of time and one half for the first Shift.
- 5. Where incremental steps exist, the employee shall be paid an increase of at least sixty-five cents (\$0.65) per hour or the next higher incremental step, whichever is greater.
- 6. Operations Administrative Clerk Office Clerk Operations Clerk Section A.2 - Leadhand Premium Employees who are assigned by the Company to perform the duties of leadhand shall receive a premium of twenty-five dollars (\$25.00) per week for the weeks they perform the duties of leadhand.
- 7. Employees shall receive a shift premium of one dollar (\$1.00) per hour for all hours worked on evening and night shifts, including overtime hours.
- 8. Employees shall be paid an additional twenty-one cents (\$0.21) per hour, effective June 1, 2003, while working at the Family Leisure Centre or the Echo Dale Regional Park.



- 9. Hourly rated employees who work an afternoon shift shall be paid one dollar (\$1.00) per hour over their regular rate of pay, if they start work prior to twelve noon, and one dollar and twenty-five cents (\$1.25) per hour if they start work after twelve noon.
- 10. Aquatic Centre employees working such shifts shall be paid appropriate shift premiums.

Here are the two miscellaneous teacher topics, which were dropped from the analysis:

1. **Teacher Leave** 4.831 0.4130 0.029. The clauses provide various types of leave (such as sick leave, maternity leave, compassionate leave, and leave for professional development or personal reasons) and ensure proportional benefits for part-time and occasional teachers, as well as specific rights related to the school calendar and adoption.

- 1. it occurs on a regular school day, a teacher shall be granted one (1) day leave with pay to attend to needs directly related to the adoption of a child.
- 2. Teachers employed on a fixed-term contract or on a part-time basis under contract shall be entitled to sick leave on a pro-rata basis.
- 3. A Teacher may be granted up to the lesser of two (2) meetings or two (2) days leave without loss of pay or Sick Leave or Cumulative Sick Leave Credits for the purpose of participating on a committee of a professional association, exclusive of committees concerned with salary negotiations.
- 4. Part-time teachers shall be paid 100% of their regular salary (as per their full-time equivalent status) for up to eleven (11) days of absence due to illness.
- 5. Effective September 1, 2014, a teacher is entitled to maternity leave for a period of fifteen (15) calendar weeks.
- 6. Any teacher may be granted, upon request and approval of the Board, a leave of absence without pay for the purpose of: (a) Improvement of qualifications, (b) travel, (c)
- 7. Each teacher in the Division shall be granted compassionate leave without loss of salary, to a maximum of one (1) day in the case of death of the teacher's sister-in-law, brother-in-law or grandparent-in-law.

- 8. The Occasional Teacher has not taught one (1) day in the previous school year unless such Occasional Teacher has been granted an extended leave in accordance with the provisions of Article 10.
- 9. The teacher shall be entitled to the same designated holidays, Christmas break, Easter or mid-winter break, and summer break, as observed by school boards of the province or territory in which he or she works.
- 10. If hired after the beginning of the fiscal year, a full-time teacher is entitled to the full allocation of sick leave credits as per sections 2 and B.6.

2. **Teacher Compensation** 6.064 0.4072 0.066. The clauses are providing rights related to recognition of experience, compensation for additional duties, payment methods, seniority benefits, and allocated time for non-teaching activities.

- 1. Experience Credit A Teacher on part-time assignment shall receive credit for teaching experience on the following basis: a) less than .5 assignment or less than one-half school year: one-half year credit.
- 2. Sample Calculations Teacher is hired and he/she has 3.2 years experience.
- 3. When a teacher provides noon supervision the teacher shall earn one day offleave, without loss of salary; for every fifteen (15) hours of noon supervision to a maximum of three (3) days.
- 4. If the position is not filled after the application of 32.06.1, any Teacher may be hired to fill the position.
- 5. b) Teachers will receive payment by automatic deposit into the financial institution they set up with the Division, at the start of such payment.
- 6. 13:02 Previous Experience a. Teachers shall receive full placement for past experience as recognized by the Department of Education to maximum.
- 7. The teacher shall receive l i
- 8. A teacher having seniority as determined by Article 13.01 who might be proposed for transfer because of a reduction of teaching time in the teacher's subject, will be given the opportunity over an incumbent with less

seniority to teach in a subject or subjects that do not require a reduction of teaching time, provided the teacher with seniority has had teaching experience in such a subject or subjects.

- 9. Teachers leaving the employment of the Board will be paid in full on or before the second Friday in July.
- 10. Teachers in Grade 7 81 8 shall be granted a minimum of 240 minutes of release time from classroom instruction per 6 day cycle, or equivalent, for the purpose of preparation, planning and evaluation.