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RESEARCH ARTICLE

The institutional environment and gig platform transaction cost solutions

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Abstract

A growing number of labour market participants transact through gig platforms. This choice should reflect a reduction in transaction costs for platform users, compared to costs they meet when using alternative modes of governance. We exploit a unique cross-platform, cross-country data set of gig platform users to test the impact of the institutional environment in one of its dimensions – the strictness of labour market regulation (LMR) – on the ability of gig platforms to reduce users' transaction costs. According to our findings, the regulation indicator of both the user and platform countries influences transaction costs for platform users, even controlling for platform and user characteristics. The platform appears to reduce transaction costs most when users face stricter *or* weaker LMR, in a U-shaped effect. In the former case, the platform may provide an escape from labour regulations when hiring for tasks, while in the latter case, the platform can economize on the usual transaction costs of private contracting by administrating some types of users' activities.

Keywords: institutions; labour market regulation; labour platforms; transaction costs

JEL codes: : D02; J44; M55

Introduction

Platforms are a relatively new business model that has expanded very quickly, with the largest corporations exploiting the platform model in different ways. Such companies aim to connect different types of users. Platforms develop internal institutions that combine the autonomy of the counterparties with some elements of hierarchy by administrating the activities of their users when transacting through the platform (Akbar and Tracogna, 2022; Nagle *et al.*, 2020). These are the features of a hybrid governance structure, as discussed in Williamson (1991, 1996) and Ménard (2004, 2022).

Labour platforms, also known as gig platforms (Elmer *et al.*, 2019), address the needs of those who require and provide labour services, generating an opportunity to match worker skills with firms or entities that require the specific services. A growing number of labour market participants choose to transact through gig platforms (De Stefano, 2016; ILO, 2021). As predicted by transaction cost economics (TCE), this might reflect a reduction in transaction costs for platform users compared to the costs they meet when choosing alternative governance structures (Williamson, 1979, 1991). Multi-sided platforms, including labour platforms, reduce transaction costs for their users. Platforms address these issues thanks to network effects as well as specialized tools including algorithmic search, rating systems, and standardization of procedures (Evans and Schmalensee, 2017; Horton *et al.*, 2018; Lobel, 2018; Oranburg and Palagashvili, 2021; van Slageren *et al.*, 2022). The possibility of lowering the monitoring and measurement costs of the platforms, for example, should affect the

platform strategy, services provided, and associated transaction costs (Cuypers *et al.*, 2021). However, detailed empirical analysis on the ability of a platform to reduce transaction costs and its determinants is lacking.

The institutional environment plays an important role in comparing transaction costs associated with alternative governance structures. Internal institutions by firms (hierarchies) and hybrids are developed in the framework of higher-level institutions, from constitutions to specific bylaws (North, 1990). The empirical literature on the change in transaction costs for economic agents across alternative governance structures arising from variation in characteristics of the institutional environment is lacking (Ménard, 2014). The complexity in quantifying transaction costs and key characteristics of the institutional environment is arguably one of the main reasons for this. Rare examples include Oxley (1999), which explores the impact of property rights regimes on the choice of governance structure for new technology international transfers; Roe (2005), which shows that the legal regime affects the institutions of corporate governance; and Naraparaju (2016), which discusses hazards of opportunistic behaviour for a day worker in an unregulated environment in India.

Based on internet access and information technologies, platforms cross borders relatively easily, reaching new geographic markets and users. This offers an opportunity to investigate the influence of country-specific institutional environments on the gig platforms' performance in addressing transaction costs. We investigate a chief characteristic of the national institutional environment that affects transaction costs for labour market participants, namely, the strictness of labour market regulation (LMR). As discussed in Wright (2004) and indirectly explored in Bhaumik *et al.* (2018), the effect we investigate might be a non-linear one.

We use a unique data set on the assessment of gig platforms by users. The database survey contains answers from more than 3,000 respondents across 53 countries. The replies allow us to assess transaction costs, presented as ex-ante, ex-interim and ex-post, following North and Wallis (1994) for the platforms' users at different stages of their interaction through the platform, from finding a counterparty to post-transaction dealings, compared to those associated with outside platform transactions. Regression analysis controlling for characteristics of platforms and respondents is used for estimating the impact of the strictness of LMR on the transaction cost difference indicators.

Our paper contributes to the literature in several ways. First, we suggest a way to assess the reduction in transaction costs for labour suppliers and demanders when transacting through gig platforms compared to the costs associated with transactions not using the platform. It is a contribution to TCE empirical studies, given that the cost measurement problem is a key barrier to research. Second, we explore the association of the institutional environment and the ability of gig platforms to develop internal institutions that are efficient in terms of transaction cost reduction. We contribute to the literature on the effects of macro institutions established at the national level on internal institutions developed by each organization. Moreover, the use of a large sample of countries and platforms allows us to disentangle the effects generated by the institutional environment in users' and platforms' countries. Finally, we contribute to the literature devoted to the analysis of multi-sided platforms. To the best of our knowledge, our paper is the first aimed at empirically testing predictions of TCE on gig platforms.

The paper is organized as follows. We first review the conceptual framework of the study, platform economics, transaction cost concepts, and issues related to labour platforms themselves. The next section provides information on the data used and the empirical model. The following section gathers the results from the empirical models. The final section contains our concluding comments.

Conceptual framework

The multi-sided platform as a governance structure

Multi-sided (often two-sided) platforms are intermediaries that provide different types of users with the opportunity to find each other with minimal costs and interact through the interface proposed by the platform (Evans and Schmalensee, 2017; Filistrucchi *et al.*, 2014; Rochet and Tirole, 2003;

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Rysman, 2009). The expansion and dominance of the multi-sided platform business model in many industries became widespread with the development of information technology in the 21st century.

Platforms act as market participants and generate internal institutions that are different from market institutions. Platform users are not employees of the company; nevertheless, the users must follow the rules of the platform when transacting through it. A platform plays the role of an administrative agency coordinating certain types of its users' actions and decisions related to their transactions. This provides a basis to classify this mode of organizing transactions as a hybrid mode (Ménard, 2004, 2022; Williamson, 1991, 1996) that displays both autonomous and cooperative adaptive capacities. Nagle *et al.* (2020) and Akbar and Tracogna (2022) provide further arguments for such classification of platforms as hybrid governance structures.

Given the growing number of users of platform services, there should be a reason that governs the choice of this governance structure as opposed to markets or hierarchies. As argued in TCE literature starting with the pioneering papers of Coase (1937, 1960), economizing on transaction costs is key to understanding the choice.[1]

Labour platforms and the transaction costs for their users

Williamson (1985: 19) describes transaction costs as 'the economic equivalent of friction in physical systems'. These are expenses associated with transactions. In any transaction, including those through platforms, transaction costs appear at different stages of the contract process (North and Wallis, 1994): before (*ex ante*), in the process (*ex interim*), and after (*ex post*) the moment of contracting. *Ex ante* transaction costs include the cost of resources associated with the search for information on available alternatives (counterparties, goods, and services) and negotiations on the price scope and deliverables of a task. *Ex interim* transaction costs include the costs of resources directly related to the contracting process: everything related to the preparation and signing of the contract (agreeing on the terms of the contract, delimiting contingencies). *Ex post* transaction costs include the cost of resources related to monitoring the implementation of contract terms and resolving conflict situations in the event of non-compliance by the parties with their obligations.

Lobel (2018) shows that digital platforms reduce the transaction costs for their users by improving information flow and reducing asymmetric information between sides that transact, addressing bargaining costs and curbing opportunistic behaviour, through a rating system and direct arbitrage of disagreements between parties. We discuss types of transaction costs and ways they may be reduced by a specific type of platform, namely, labour platforms or gig platforms.

Labour platform users are, on one side, recruiters, firms, or employers requesting services from people, and, on the other side, self-employed workers interested in selling their skills and time for fulfilling a task. There are two types of gig platforms (Bogliacino *et al.*, 2020): (i) those that provide repeated interactions for the same type of task, such as delivery apps or ride hailing apps (mobile labour markets), and (ii) those that provide jobs and various tasks (online labour markets). van Slageren *et al.* (2022) denote these as on-site gig platforms and online gig platforms, respectively.

The activities of the gig platforms may range from microtasks, simple activities that need to be replicated, to actual hiring of freelancers for medium-term projects (e.g. Vallas and Schor, 2020). Other labour platforms are hiring platforms that specialize in collecting and organizing potential employees' CVs to match on-site (or even remote) labour contracts (permanent or short-term). We focus on online labour platforms, or gig platforms, that provide services for hiring freelancers for delimited tasks or longer contracts.

There are many costs involved in contracting and providing service through a gig platform: defining the task to be contracted, objectively defining what is to be delivered and under what conditions, providing payment, and organizing actions in case of contingencies, all the while curbing

[1]The criterion for the choice of governance structure organizing commercial transactions is cost economizing, which consists of two parts: economizing on production expense and economizing on transaction costs (Williamson, 1979). In this paper, we focus on the second part.

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opportunistic behaviour and inducing effort. The platform attractiveness is that it provides a good environment in which to transact because it reduces costs, mainly, but not limited to, information disclosure, standardization of procedures, and payment (Horton *et al.*, 2018; Oranburg and Palagashvili, 2021; van Slageren *et al.*, 2022).

Following North and Wallis (1994), gig platforms reduce *ex ante* transaction costs, as their databases provide extensive information on those interested in hiring services and those interested in selling required labour services, including past interaction with other users (a reputational system); that database is processed through algorithms that provide best matches across sides of the platform, including price. Platforms may provide standardized contract forms as well, where duties and rights for both sides are made explicit. Gig platforms also contribute to reducing *ex interim* transaction costs, as they arrange an environment in which to sign a contract. *Ex post* transaction costs are addressed by the gig platforms in providing payment services and allowing the enforcement of contracts in case of contingencies or fraud or opportunistic behaviour, to the point of arbitraging the situation, withholding payment, registering the user history, rating such situations, and even blocking users considered delinquent.

Labour platforms and the institutional environment

From a Coasean perspective, rules and regulations are designed to reduce transaction costs to 'move to more efficient and fair outcomes for all parties involved' (Coase, 1960). We focus on this role of national institutions, keeping in mind that they can serve other goals as well. As our research explores gig platforms, we focus on a chief characteristic of the institutional environment: the strictness of LMR, i.e., the rigidity of restrictions related to maximum workload, minimum wages, protection against unfair dismissal and discrimination, the right to join trade unions, etc.

LMR does influence the transaction costs of employers and employees irrespective of the mode of governance chosen. First, the law supports economizing on the costs related to safeguarding against opportunistic behaviour, fixing rights and responsibilities of the agents (minimum/maximum workload, reasons to dismiss, illegality of discrimination, etc.) and making it easier to (re)negotiate the terms of contracts and resolve conflicts in court. Second, the norms might result in the redistribution of bargaining power between the sides of transaction. For example, restrictions such as severance payments by employers in case of unjust dismissal limit employers' ability to hold-up employees (Acharya *et al.*, 2013). Employers meet an opposite effect as the bargaining power of employees increases (Traverso *et al.*, 2023). This might require developing costly incentive and control instruments by employers. Third, the norms may restrict labour market participants' flexibility to adapting to changing market circumstances. Overcoming normative restrictions of the law is associated with additional transaction costs. Harder dismissal rules and increasing risks of employees' hold-up make employees more demanding when searching for labour, thus making it more costly for employers/contractors to find a good worker match. Coming to an agreement on not-typical contract terms becomes more difficult as well in case they are regulated by law. Dismissal and conflict resolution procedures established by law might also be very time/effort demanding and costly. Informal employment is an example of an extreme flexibility solution, associated with high opportunistic costs on both sides.

Wright (2004) points out that the trade-off between the hazards of opportunism and losses from inflexibility should result in a quadratic association between the strictness of regulatory constraints and the economic performance (e.g. productivity, profitability) with the lowest performance associated with a highly regulated and highly deregulated environment. In application to the labour market, this is empirically confirmed in Bhaumik *et al.* (2018), which shows that labour regulations that are either too strict or too lax decrease country total factor productivity. High transaction costs associated with the extremes are an important factor. However, to the best of our knowledge there are no papers aimed at direct testing of the effects of regulation on transaction costs for economic agents rather than on their performance.

Williamson (1985) argues that governance structure choice is a way to minimize transaction costs by balancing between the costs associated with opportunistic behaviour and losses from inflexibility. A gig platform, as a hybrid governance structure, is able to provide solutions to its users. Transacting through a

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platform, they keep advantages of market adaptation, i.e., flexibility. Specialized platform tools (algorithmic search, rating systems, arbitrage system, etc.) support economizing on the costs associated with opportunistic behaviour, as described in the previous section. This lets us posit that the ability of platforms to develop internal institutions that are most effective at economizing on transaction costs compared to alternative governance structures is highest at the extremes of the strictness of labour regulation scale. A U-shaped association between, on the horizontal axis, the (non)strictness of labour regulation institutions in a region and the success of a platform in addressing transaction costs compared to alternative governance structures is the first hypothesis we test in the empirical part of our paper.

However, the ability of a gig platform to develop transaction costs economizing internal institutions can be constrained by laws and regulations. In the hierarchy of institutions (North, 1990), the rules created by a platform to coordinate the activities of its users are lower-level institutions developed in the framework of higher-level institutions (from constitutions to specific bylaws). The norms of the labour legislation may influence the terms and conditions and the institutions created by the gig platform to organize transactions, as in Koutsimpogiorgos *et al.* (2023). The stricter the labour regulation, the less the platform is able to address transaction costs by developing internal rules that are different from the outside ones. First, the platform has fewer options for internal regulatory requirements beyond those established by law. Second, the window of opportunity to weaken the effect of the normative restrictions is narrower, as users may take the platform to court for breach of the current labour contracting law. A monotonic relation between the strictness of the labour regulation and the ability of a gig platform to develop transaction costs minimizing internal institutions is the second testable hypotheses from this analysis.

Empirical approach and data

Research hypotheses and empirical model

We explore empirically if gig platform institutions can reduce transaction costs for platform users. The main challenge of such empirical studies is measuring transaction costs. The unique data we use, described below, contains assessments of different platform services by their users. The questions are formulated in a way that, we believe, reflects the ability of gig platforms to reduce transaction costs related to types of users' activities compared to those the users would meet transacting in a regular market. Through the questions, we infer the difference in transaction costs between the governance structures rather than absolute levels of the costs.

The focus of the study is the impact of higher-level national labour market institutions on the ability of lower-level platform institutions in economizing users' transaction costs. More precisely, we consider a characteristic of the institutional environment that is significant for the labour market, namely, the strictness of LMR. The scope of regulatory constraints is expected to affect absolute and relative transactional costs associated with alternative modes of organizing transactions that labour market participants meet.

Following the results of the literature overview above ('Labour platforms and the institutional environment' section), we summarize the following empirical hypotheses:

Hypothesis 1 (H1). The ability of a gig platform to reduce transaction costs for its users compared to alternative modes of governance is affected by the strictness of the labour market regulation in the user country in a U-shape manner.

As explained in the previous section, this reflects that transaction costs of labour market participants are higher in either highly regulated or highly deregulated environments, as those extremes give a gig platform more opportunities to develop transaction costs minimizing internal institutions.

Hypothesis 2 (H2). The ability of a gig platform to reduce transaction costs for its users compared to alternative modes of governance decreases with the strictness of LMR in the platform country of origin.

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As explained in the last part of the previous section, internal institutions are developed in the framework of higher-level institutions (labour law) that restricts the choice of transaction cost minimizing tools that a gig platform can offer to its users.

The general form of the estimated regressions that incorporates H1, H2 and controls for platform and user characteristics is as follows:

$$TC_i^k = \alpha + \beta_1^U\, SR_i^{CU} + \beta_2^U\left[SR_i^{CU}\right]^2 + \beta^P SR_j^{CP} + \gamma X_j^P + \varphi X_i^U + \varepsilon_i \quad (1)$$

where TC_i is the assessment of the platform to reduce transaction costs for type k by respondent i, as in Table 1 below; SR_i^{CU} and SR_j^{CP} are the strictness of LMR indicator of the user i country of residence and the platform j country of origin, correspondingly; X_j^P – a vector of platform j characteristics; X_i^U – a vector of user characteristics. We estimate the model using least squares with coefficient standard errors adjusted for departures from the classical model. To avoid confusion with other characteristics that may affect the outcome, we control for observed characteristics of the platform and the user.

The data of the study is a survey of gig platform users conducted by the International Laboratory for Digital Transformation in Public Administration at HSE University in Moscow, Russia, in December 2021.[2] After removing observations with omitted essential information, the database contains the answers of 3,149 respondents to questions characterizing various activities through labour platforms. We distinguish between two groups of gig platform users (two sides of the platform): 2,858 respondents are classified as 'workers' who use the platform to find tasks and activities to be fulfilled, and 291 respondents are classified as 'employers' who search for contractors.

The questions asked of the respondents can be divided into several blocks, including general characteristics of the respondents and their experience of interaction with the gig platform, assessment of the level of different platform services, benefits associated with using the platform, experiences of conflict with the counterparty, and the associated risks for the user. These follow the mapping of possible transaction costs on gig platforms as seen in the previous section and discussed in Horton *et al.* (2018), Oranburg and Palagashvili (2021), and van Slageren *et al.* (2022).

Measuring transaction costs

The information on the structured survey was used to construct the transaction cost indicators (TC indicators hereafter). Table 1 summarizes the respondents' responses to such questions. They are grouped according to the classification of transaction costs associated with the contract process according to a temporal principle described previously: before (*ex ante*), during (*ex interim*), and after (*ex post*) the process of contracting. Either directly or indirectly, they reflect the problems that may arise at different stages of interaction between platform users, from finding a counterparty and concluding a contract to resolving conflicts related to the opportunistic behaviour of the counterparty. Questions assume either an assessment of the degree of agreement with the proposed statement on a certain scale or, in one case, a binary answer of the respondent in yes/no format.

In all questions but TC4-1 and TC4-2e, a respondent is asked to assess either their level of satisfaction with the services of the platform or the extent of agreement with a statement that the platform provides high-quality service. A high level of satisfaction means that users find it easy to use the service and rarely meet problems; it is associated with comparatively low related transaction costs. For example, a high level of satisfaction with searching for counterparties through a platform means that the search requires little time and effort to enable good matching with the required characteristics of a counterparty. Similarly, strong agreement with the statement that payment is safe means that expected risks and spending on potential conflict resolution are low.

[2]HSE University patent № 6.0029-2023 listed at https://www.hse.ru/info/patent.

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Table 1. Transaction cost indicators

Statement to be assessed/Survey question	TC indicator	Scale
Ex ante: The stage of finding a counterparty		
To what extent do you agree with the following statement? **Employers:** The platform provides a non-biased search for job contractors (counterparts) **Workers:** The platform provides a non-biased search for information about jobs (orders).	TC1-1	1 – strongly disagree to 5 – strongly agree
How satisfied are you with the following platform tool? Access to the platform (registration)	TC1-2	1 – completely dissatisfied to 5 – completely satisfied
How satisfied are you with the following platform tool? Searching for counterparties (jobs, orders)	TC1-3	1 – completely dissatisfied to 5 – completely satisfied
How satisfied are you with the following platform tool? Negotiation with potential counterparties	TC1-4	1 – completely dissatisfied to 5 – completely satisfied
Ex interim: The stage of concluding the contract		
How satisfied are you with the following platform tool? Service of concluding contracts (orders)	TC2	1 – completely dissatisfied to 5 – completely satisfied
Ex post: The stage of fulfilment of obligations under the contract		
Employers: To what extent do you agree with the following statement? The conclusion of standard forms of contracts (agreements) on the platform guarantees the execution by the counterparty.	TC3-1e	1 – strongly disagree to 5 – strongly agree
Workers: To what extent do you agree with the following statement? The accumulation of data about my activity on the platform stimulates my responsibility for job completion.	TC3-1w	1 – strongly disagree to 5 – strongly agree
To what extent do you agree with the following statement? Carrying out agreements with the counterparty is safe.	TC3-2	1 – strongly disagree to 5 – strongly agree
To what extent do you agree with the following statement? Payment is safe.	TC3-3	1 – strongly disagree to 5 – strongly agree
How satisfied are you with the following platform tools? Receiving payment	TC3-4	1 – completely dissatisfied to 5 – completely satisfied
Ex post: The stage of conflict resolution		
Have you experienced any cases of fraud or non-fulfilment of obligations on the part of your counterparties on the platform?	TC4-1	0 – yes 1 – no
[**if TC4-1 = Yes**] **Employers:** In your experience, have you ever had to require the contractor to redo the work done?	TC4-2e	1 – often to 4 – never
[**if TC4-1 = Yes**] **Workers:** In your experience, if the customer did not accept the work performed, how justified were the refusals?	TC4-2w	1 – none justifiable to 4 – all justifiable
[**if TC4-1 = Yes**] How satisfied are you with the following platform tool? the arbitrage service	TC4-3	1 – completely dissatisfied to 5 – completely satisfied

It should be noted that such an assessment of quality or satisfaction can be made only by comparison with an unobserved benchmark that should be related to the experience of the person using alternatives (transacting outside the platform). Thus, we believe that the TC indicators are relative rather than absolute and measure the ability of a platform to reduce transaction costs compared to alternative governance structures. The exceptions are TC4-1 and TC4-2e, which measure the frequency of a

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no-conflict situation and, thus, are associated with the absolute level of corresponding transaction costs.

A clear advantage of the data set, compared with other studies, is the user *and* platform international coverage. The total number of platforms mentioned by at least one respondent is 83, with 27 platforms mentioned only once. Respondents to the interview were residents of 53 countries.

Table 2 presents the TC indicator sample statistics. The results are presented for different types of users: workers and employers. The data indicates a fairly high level of respondent satisfaction on both sides of gig platforms at all stages of interaction up to the conflict resolution stage. In most indicators, workers and employers have different response profiles, as a χ^2 independence test of the answers across types is rejected for TC1-2, TC1-4, TC2, TC3-3, TC3-4, TC4-1, and TC4-3. The differences are often small, as seen in the average responses.

Looking at TC4-1, more than half of the users of the employer type (57%) faced fraud or non-fulfilment of obligations under the contract, and only 30% of users of the worker type indicated such an experience. One of the reasons for such a difference may be that the employer engages more often with employees than vice versa. On the other hand, both sides seem to be satisfied with the arbitrage service (TC4-3).

Sample descriptive statistics, however, provide only a general idea of the reduction in transaction costs by gig platform users compared to alternative governance structures at different stages of users' interaction.

Table 2. TC indicators: descriptive statistics

	Descriptive statistics: Mean (st. dev.)		
TC indicator	Employers	Workers	Equality test employer/worker *P*-value
Ex ante: The stage of finding a counterparty			
TC1-1	3.65 (0.96)	3.59 (0.93)	0.123
TC1-2	3.77 (0.92)	3.94 (0.81)	0.000***
TC1-3	3.58 (0.86)	3.65 (0.84)	0.095*
TC1-4	3.70 (0.91)	3.52 (0.86)	0.000***
Ex interim: The stage of concluding the contract			
TC2	3.71 (0.97)	3.66 (0.82)	0.000***
Ex post: The stage of fulfilment of obligations under the contract			
TC3-1e	3.69 (0.84)		
TC3-1w		3.69 (0.85)	
TC3-2	3.75 (0.79)	3.83 (0.80)	0.300
TC3-3	3.90 (0.94)	4.06 (0.83)	0.000***
TC3-4	3.80 (0.93)	3.97 (0.87)	0.005***
Ex post: The stage of conflict resolution			
TC4-1	0.43	0.70	0.000***
TC4-2e	2.37 (0.73)		
TC4-2w		2.74 (0.90)	
TC4-3	3.76 (0.79)	3.55 (0.81)	0.000***

Source: author estimates. Equality test employer/worker is the *P*-value of Pearson χ^2 test for the equality of the distribution of answers across user types (workers and employers).

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Measuring factors affecting transaction costs for users of labour platforms

Characteristics of the labour market institutional environment

In this paper, we use several alternative indicators that measure strictness of LMR. The main indicator is the sub-index on labour freedom (LF) of the Economic Freedom Index calculated by the Heritage Foundation. In contrast to alternatives, the indicator is available for all countries in the sample. To check for robustness, we use the LMR sub-index of the Index of Economic Freedom calculated by the Fraser Institute, and two sub-indexes of the Employment Protection Index (EPI) calculated by the OECD: (i) Strictness of dismissal regulation for workers on regular contracts, both individual and collective dismissals (*EPRC*) and (ii) Strictness of regulation of temporary labour contracts (*EPT*).

LF and LMR associate a higher indicator value with fewer restrictions to hire labour, such as the absence of a minimum wage or severance payments. Freedom is understood as the possibility to contract more flexibly. In contrast, an increase in the value of EPRC and EPT means less freedom in employer/worker relations. It is worth mentioning as well that the alternative indicators measure different aspects of the labour market institutional environment. LF and LMR measure various aspects of the regulatory framework; EPRC and EPT are focused on the regulation of workers' dismissal. The coverage of the indicators in terms of countries and years is also different.

According to H1 and H2, the indicators' values are collected both for the platforms' country of origin and for the respondents' country. Only in 27.5% of observations is the respondent's country the same as the platform's country of origin. This provides significant variation to identify the effects of the institutional environment of the user and the platform country. Descriptive statistics are provided in Table 3.

We explored two years of the LF, 2020 and 2021. The comparison of the index across countries indicates that there is basically no change across the years, confirming that labour market reforms may not have taken place near the data collection period.

Characteristics of a labour platform

The business models of labour platforms are not unique. Transactional and non-transactional platforms are described in the economic literature (Filistrucchi *et al.*, 2014). In the first case, users carry out transactions through the interface developed by the platform. In other cases, transactions between the parties are not observed for the platform, and the service provided is the possibility to meet other users. Platforms that observe transactions should differ in their ability to develop transaction cost minimizing institutions.

Table 3. Strictness of LMR indicators: variables and descriptive statistics

	Number of countries	Number of observations	Mean	St. dev.	*t*-test *P*-value
User country. LF_2021/100	52	3,149	0.66	0.17	0.000
Platform country. LF_2021/100	14	3,149	0.68	0.16	
User country. LMR_2020	51	3,149	7.51	1.22	0.0668
Platform country. LMR_2020	14	3,149	7.46	1.21	
User country. EPRC_2019	26	2,506	1.93	0.57	0.2005
Platform country. EPRC_2019	9	2,522	1.91	0.48	
User country. EPT_2019	26	2,506	1.14	0.96	0.0259
Platform country. EPT_2019	9	2,522	1.08	0.77	

Source: author estimates based on survey data.
Note: standard *t*-test with unequal variances for mean differences carry a *P*-value of 0.000, indicating mean differences. Statistics weighted by the number of each country respondent in the sample.

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Table 4. Characteristics of respondents: variables and descriptive statistics

Statement	Variable name	Coding	Descriptive statistics: Mean (st. dev.) Workers 2,858 obs.	Descriptive statistics: Mean (st. dev.) Employers 291 obs.
How long have you been using the platform?	*Experience*	= 1 if <1 month = 2 if 1–6 months = 3 if 7–12 months = 4 if 1–2 years = 5 if 3–4 years = 6 if 5+ years	2.86 (1.52)	3.03 (1.37)
Overall, can you say that most people can be trusted or that you need to be very careful when dealing with people?	*Trust*	= 1 if a respondent chose 'most people can be trusted'; = 0 otherwise	0.53	0.68

In the survey, only 15% of users state that the platform allows posting permanent (long-term) employment. On the other hand, almost all platforms (91% of observations) are transaction platforms, i.e., they provide contracting *and* payment through their interface. Interestingly, the data shows that transaction platforms (contracting through the platform) do not offer permanent employment opportunities, only short-term or tasks. The non-transaction platforms offer both types of jobs. As payment through the platform and contracting through the platform are almost one to one, in the regression analysis below we use only the first of the two characteristics.

Individual characteristics of respondents

An advantage of the data is that we have assessments of respondents of the platform users from both sides of the platform. We consider three characteristics of the respondents that are expected to have an impact on their assessments: user type, experience using platform services, and general trust in people. Descriptive statistics are in Table 4. The experience of the users is very similar across user types, although statistically significantly different, with the experience of employers slightly higher. Employers tend to trust people more, according to the survey results.

Results and discussion

The results of the regression models with the LF indicator of the strictness of LMR are presented in Tables 5–7 and 8 for the previously identified groups of transaction costs. Given that the data is a user-level cross-section and that the dependent variables are numerical, we use the OLS method. In the case of TC4-1, which is the only binary dependent variable, we also assess Probit regression. Estimated marginal effects are the same with the OLS estimates.[3]

We are most interested in learning about whether there is a relationship between the strictness of LMR and the capability of the platform to address selected transaction costs. Recall that (i) an increase in LF associates with less strict LMRs, and (ii) the dependent variable has a higher value if transaction costs are effectively reduced by the platform compared to alternative governance structures.

According to the results of the regression model estimation, the strictness of LMR, both in the user and platform countries, affects the ability of a platform to address transaction costs for labour platform users at all stages of their communication from searching for a counterparty to conflict resolution. The variables for a user's countries are significant in all regressions, while for platform countries they are

[3]Our results confirm Wooldridge (2010) that the slope of the marginal effect in a probit regression is often close to the estimated slope coefficient in a linear probability model (LPM/OLS).

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Table 5. Regression results: transaction costs 'ex ante' and 'ex interim'

	TC1-1	TC1-2	TC1-3	TC1-4	TC2
LF – user country	−9.45*** (1.22)	−3.52*** (1.13)	−5.49*** (1.05)	−8.85*** (1.14)	−7.37*** (1.13)
LF – platform country	0.16 (0.11)	0.09 (0.10)	0.20* (0.10)	−0.12 (0.10)	0.12* (0.10)
[LF – user country]^2	7.69*** (0.91)	2.57*** (0.84)	4.26*** (0.79)	6.93*** (0.86)	5.81*** (0.84)
Different countries	0.02 (0.04)	−0.06* (0.03)	−0.03 (0.03)	−0.02 (0.03)	0.01 (0.03)
Trust	0.10*** (0.03)	0.04 (0.03)	0.09*** (0.03)	0.19*** (0.03)	0.14*** (0.03)
Experience	0.01 (0.01)	0.03*** (0.01)	0.03*** (0.01)	0.02** (0.01)	0.03*** (0.01)
Permanent job offers available	0.12* (0.06)	0.08 (0.05)	0.14*** (0.05)	0.19*** (0.06)	0.08 (0.05)
Payment through the platform	0.14* (0.08)	0.14** (0.08)	0.14** (0.07)	−0.02 (0.07)	0.07 (0.08)
User type (Worker = 1)	0.10* (0.06)	0.18*** (0.06)	0.14** (0.05)	−0.04 (0.06)	0.06 (0.06)
Constant	5.84*** (0.41)	4.62*** (0.38)	4.77*** (0.36)	6.12*** (0.38)	5.45*** (0.38)
Num. of observations	3,149	3,149	3,149	3,149	3,149
Regr. Signif test	0.0000	0.0000	0.0000	0.0000	0.0000

Table 6. Regression results: transaction costs 'ex post': monitoring

	TC3-1e	TC3-1w	TC3-2	TC3-3	TC3-4
LF – user country	−13.57*** (4.66)	−8.05*** (1.12)	−5.34*** (1.06)	−6.23*** (1.09)	−5.23*** (1.14)
LF – platform country	−0.04 (0.30)	0.14 (0.10)	0.17* (0.09)	0.18* (0.10)	0.23*** (0.10)
[LF – user country]^2	10.15*** (3.51)	6.46*** (0.84)	4.31*** (0.79)	4.72*** (0.83)	3.96** (0.85)
Different countries	0.04 (0.14)	0.01 (0.04)	−0.02 (0.03)	−0.02 (0.03)	−0.13*** (0.03)
Trust	−0.13 (0.11)	0.07** (0.03)	0.12*** (0.03)	0.05* (0.03)	0.06* (0.03)
Experience	0.06* (0.04)	0.03*** (0.01)	0.05*** (0.01)	0.09*** (0.01)	0.08*** (0.01)
Permanent job offers available	−0.07 (0.20)	0.07 (0.05)	0.00 (0.06)	−0.08 (0.06)	−0.01 (0.05)
Payment through the platform	−0.07 (0.24)	−0.00 (0.08)	0.05 (0.08)	0.09 (0.08)	0.09 (0.08)
User type (Worker = 1)			0.18*** (0.05)	0.21*** (0.06)	0.22*** (0.06)
Constant	7.82 (1.59)	5.78*** (0.38)	4.81*** (0.36)	5.30*** (0.36)	4.96*** (0.38)
Num. of observations	291	2,858	3,149	3,149	3,149
Regr. Signif test	0.0982	0.0000	0.0000	0.0000	0.0000

Table 7. Regression results: transaction costs 'ex post': conflict resolution

	TC4-1[a]				
	Probit	OLS	TC4-2e	TC4-2w	TC4-3
LF – user country	6.67*** (0.52)	7.41*** (0.59)	9.79** (4.89)	−12.84*** (2.04)	−12.36*** (2.43)
LF – platform country	0.15*** (0.05)	0.17*** (0.05)	−0.19 (0.25)	−0.04 (0.16)	0.29 (0.18)
[LF – user country]^2	−5.24*** (0.39)	−5.84*** (0.44)	−7.15* (3.65)	10.00*** (1.54)	9.63*** (1.83)
Different countries	−0.03 (0.02)	−0.03** (0.02)	−0.03 (0.10)	0.07 (0.06)	0.07 (0.07)
Trust	−0.18** (0.02)	−0.19*** (0.02)	−0.05 (0.10)	0.39*** (0.07)	0.14** (0.07)
Experience	−0.00 (0.01)	0.00 (0.01)	−0.04 (0.03)	−0.09*** (0.02)	0.00 (0.02)
Permanent job offers available	−0.01 (0.03)	−0.01 (0.03)	−0.23 (0.17)	0.11 (0.11)	0.01 (0.11)
Payment through the platform	0.27*** (0.04)	0.27*** (0.04)	−0.12 (0.19)	−0.05 (0.12)	−0.08 (0.13)
User type (Worker = 1)	0.12*** (0.03)	0.14*** (0.03)			0.01 (0.07)
Constant		−1.88*** (0.20)	−0.53 (1.61)	6.60*** (0.67)	7.02*** (0.81)
Num. of observations	3,149	3,149	166	860	1,026
Regr. Signif test	0.0000	0.0000	0.1047	0.0000	0.0000

Source: author estimates based on survey data and institutional indicators.
[a]TC4-1: we use both OLS and probit, as the dependent variable is binary. Marginal effects in are reported on Probit. TC4-2e, TC4-2w and TC4-3 apply only to those users that TC4-1 = 1. See Table 2.

Table 8. Robustness checks: alternative strictness of LMR indicators

		Institutional index variable		
Dependent variable	Institutional index country	LMR	EPRC	EPT
Transaction costs 'ex ante' and 'ex interim'				
TC1-1	User country	−0.92*** (0.18)	−1.80*** (0.33)	−0.77*** (0.09)
	Platform country	0.02 (0.01)	−0.06 (0.04)	−0.02 (0.03)
	[User country]^2	0.07*** (0.01)	0.35*** (0.08)	0.20*** (0.03)
TC1-2	User country	−0.27* (0.15)	−0.75** (0.30)	−0.34*** (0.08)
	Platform country	0.00 (0.01)	−0.01 (0.04)	−0.04 (0.03)
	[User country]^2	0.02 (0.01)	0.17** (0.07)	0.11*** (0.03)
TC1-3	User country	−0.51*** (0.17)	−1.46*** (0.31)	−0.46*** (0.08)
	Platform country	−0.00 (0.01)	−0.09** (0.04)	−0.06** (0.03)
	[User country]^2	0.04*** (0.01)	0.32*** (0.08)	0.13*** (0.03)
TC1-4	User country	−0.70*** (0.18)	−1.99*** (0.32)	−0.66*** (0.09)
	Platform country	−0.05*** (0.01)	−0.00 (0.04)	−0.00 (0.03)
	[User country]^2	0.05*** (0.01)	0.42*** (0.08)	0.18*** (0.03)
TC2	User country	−0.85*** (0.16)	−1.52*** (0.30)	−0.53*** (0.08)
	Platform country	0.00 (0.01)	−0.06 (0.04)	−0.06** (0.03)
	[User country]^2	0.06*** (0.01)	0.32*** (0.07)	0.14*** (0.03)
Transaction costs 'ex post': Monitoring				
TC3-1e	User country	−1.09** (0.45)	−2.04 (1.28)	−0.73** (0.37)
	Platform country	0.00 (0.05)	−0.08 (0.14)	−0.06 (0.08)
	[User country]^2	0.07** (0.03)	0.47 (0.32)	0.22* (0.13)
TC3-1w	User country	−0.95*** (0.17)	−2.08*** (0.32)	−0.70*** (0.09)
	Platform country	0.01 (0.01)	−0.01 (0.05)	−0.01 (0.03)
	[User country]^2	0.07*** (0.01)	0.45*** (0.08)	0.20*** (0.03)
TC3-2	User country	−0.72*** (0.16)	−1.48*** (0.29)	−0.54*** (0.08)
	Platform country	0.02* (0.01)	−0.02 (0.04)	−0.03 (0.02)
	[User country]^2	0.05*** (0.01)	0.32*** (0.07)	0.15*** (0.03)
TC3-3	User country	−0.40** (0.16)	−0.84*** (0.30)	−0.29*** (0.08)
	Platform country	0.04*** (0.01)	−0.04 (0.04)	−0.07*** (0.03)
	[User country]^2	0.03*** (0.01)	0.19*** (0.07)	0.09*** (0.03)
TC3-4	User country	−0.41** (0.16)	−1.03*** (0.32)	−0.31*** (0.09)
	Platform country	0.03** (0.01)	−0.07 (0.04)	−0.10*** (0.03)
	[User country]^2	0.03** (0.01)	0.23*** (0.08)	0.09*** (0.03)
Transaction costs 'ex post': Conflict resolution				
TC4-1	User country	0.57*** (0.09)	1.40*** (0.15)	0.29*** (0.04)
	Platform country	0.02*** (0.01)	−0.08*** (0.02)	−0.07*** (0.01)
	[User country]^2	−0.04*** (0.01)	−0.30*** (0.04)	−0.07*** (0.01)

(*Continued*)

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Table 8. (*Continued.*)

Dependent variable	Institutional index country	Institutional index variable		
		LMR	EPRC	EPT
TC4-2e	User country	−0.26 (0.51)	1.53 (1.72)	0.22 (0.46)
	Platform country	−0.06 (0.05)	0.04 (0.11)	0.02 (0.06)
	[User country]^2	0.02 (0.03)	−0.39 (0.44)	−0.08 (0.16)
TC4-2w	User country	−0.74** (0.36)	−2.21*** (0.71)	−0.72*** (0.18)
	Platform country	0.02 (0.02)	0.01 (0.06)	−0.00 (0.04)
	[User country]^2	0.05** (0.02)	0.48*** (0.18)	0.19*** (0.07)
TC4-3	User country	−1.00*** (0.36)	−2.69*** (0.77)	−0.88*** (0.20)
	Platform country	0.05* (0.03)	−0.07 (0.08)	−0.05 (0.05)
	[User country]^2	0.07*** (0.02)	0.59*** (0.20)	0.24*** (0.07)

Note: Std. errors in parenthesis. Regressions details are provided in the supplementary materials. Sample sizes 3,148 (LMR)/2,152 (EPRC, EPT), TC3-1e:291 (LMR)/212 (EPRC, EPT); TC3-1w: 2,857 (LMR)/1,940 (EPRC, EPT); TC4-2e:166 (LMR)/126 (EPRC, EPT); TC3-1w:860 (LMR)/564 (EPRC, EPT); TC4-3: 1,026 (LMR)/690 (EPRC, EPT).

significant in about half of the regressions. This suggests that the external institutional environment may matter more for users than for platform design.

Regarding the user country institutional environment, the results are remarkably consistent with H1.[4] The effect is U-shaped for all TC indicators, suggesting that both the weakest and the strictest LMRs provide more opportunities for platforms to address transaction costs in the users' view. The relatively lowest satisfaction with the handling of transaction costs by the platform is surprisingly close to the sample average. For example, in the case of TC1-1, the marginal effect of LF changes sign at LF = 0.61, which is the sample average, as seen in Table 3.

Note that in contrast to other TC indicators, TC4-1 and TC4-2e are absolute rather than comparative measures of the costs of transacting through a gig platform. They reflect the frequency of no fraud or non-fulfilment that the respondents and the sub-group of employers meet. For these dependent variables, the effect of the strictness of LMR is inversely U-shaped. It suggests that platform users in the countries with middle-range strictness of LMR are less prone to fraud or non-fulfilment. It is not possible in this case, however, to distinguish the effects from national and platform internal institutions.

In addition, the results suggest the role of the LMR in the platform's country of origin, as the coefficient of platform LF is significant in about half of TC indicators. This is consistent with H2. According to the estimates, a platform whose country of origin is characterized by less restrictive LMR (higher LF) provides better services to users in other countries insofar as such services are associated with the capacity to lower user transaction costs. The result suggests that cross-border effects of the national institutional environment are present in the digital economy.

To test for robustness, we run the same regressions using alternative LMR indicators. The coefficients to the indicators are summarized in Table 8.

The results are remarkably robust. The impact of the strictness of LMR on the ability of a platform to reduce transaction costs for its users is U-shaped. Less restrictive LMR in the platform country of origin increases the ability if the effect is found to be statistically significant.

[4]We re-estimated the models using (i) fixed effects for platforms instead of platform information and (ii) additional user personal characteristics of users (age, gender, education). The results – namely, the U-shape and the inflection point – do not change. See supplementary materials.

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There are also several interesting results related to control variables on Tables 5–7. First, transaction cost reduction by gig platforms is assessed higher by respondents who state that 'most people can be trusted', with one exception (TC4-1 indicator). This result might have a pure psychological explanation that such respondents are more optimistic or naive and focus more on opportunities than on related problems. Alternatively, this result could reflect that the sub-group of respondents met problems less often in the past, including those related to transacting through labour platforms. So as not to deviate from our main goals in the paper, we leave the exploration of this result for later studies.

Second, users' assessments of transaction cost reduction by gig platforms seem to increase with their experience in dealing with the platform at all stages of communication, from searching for a counterparty to monitoring contract fulfilment. It may be a learning-by-doing effect or a sample attrition, i.e., those who are not satisfied with the platform will not continue using it and have a lower experience period on the platform. On conflict resolution (Table 7), the effect of experience is statistically significant for TC4-2, suggesting the more experienced workers are, the less justified they consider refusals by contractors.

Third, *ex ante* transaction cost reduction by gig platforms related to the search of a counterparty are assessed higher if the platform offers permanent jobs. The factor is not statistically significant for *ex interim* and *ex post* transaction costs. This is expected, as parties do not conclude the interaction through the platform after contacting each other.

Last, if contracts and payments are made through the platform, this does not affect the ability of the company to reduce transaction costs up to the stage of conflict resolution. It does, however, decrease the frequency of conflicts (TC4-1). This reflects the role of a labour platform as a mediator. The presence of a third party that observes contract obligations and their fulfilment decreases the risk of opportunistic behaviour by the counterparties, as expected from a properly designed platform.

Concluding comments

Labour platforms or gig platforms are internet-based two-sided enterprises that provide opportunities for workers who seek tasks, activities, or long-term jobs on one side and for those who seek workers on the other. These platforms develop internal institutions that combine the autonomy of counterparties with some elements of hierarchy by administrating the activities of their users. The rise in labour market participants transacting though gig platforms reflects that this hybrid governance structure provides benefits to its users economizing on transaction costs, compared to traditional alternatives. The ways in which labour platforms reduce transaction costs for their users are exemplified in the literature, but detailed empirical analysis of the ability of the platform to reduce transaction costs is lacking.

The ability of a gig platform to reduce transaction costs for its users depends both on the success of the platform in developing internal institutions and on the institutional environment in which the platform and the users are immersed. We take advantage of a unique cross-national survey of gig platform users that is well placed to test the hypothesis that LMR matters for the ability of the platform to address the transaction costs for its users. The database covers different countries and user types and is based on information from a large number and variety of platforms. Previous papers on gig platform users tend to focus on a single platform or only on aggregate-level data.

Our estimates show that the impact of the strictness of LMR on the ability of a platform to reduce transaction costs for its users is U-shaped. This reflects that both the weakest and the strictest LMR provide better opportunities for platforms to address transaction costs in the users' view. In the former case, the platform provides an escape from labour regulation when hiring tasks, and in the latter, the platform can economize on the usual transaction costs of private contracting by administrating some types of user activities. This result is consistent with theoretical predictions of the U-shaped effects of regulation on economic agents' performance.

The estimates also suggest that the ability of a gig platform to reduce transaction costs for its users is higher the less restrictive the LMR in the platform's country of origin is. A gig platform that

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developed its business model in a country with a laxer LMR faces fewer legal restrictions on the set of transaction costs economizing tools and services that it can provide to its users.

The results are remarkably consistent to a variety of specifications, such as the use of different LMR indicators, the inclusion of observed characteristics of the users, and the control of unobserved fixed effects of platforms.

The results stress that in the era of digitalization, in which IT technology-based businesses easily cross borders, the state as a regulator of economic processes is still an important actor that influences the business environment and the transaction costs for economic agents. The results suggest that effects from changes in the regulation on the choice between alternative governance structures depend on the relative position of the regulation in the strictness scale. Initiatives that result in an increase in the strictness of regulation when it is already high might lead to a shift from employment to contracting through gig platforms, thus weakening the regulatory effect. When decreasing regulatory constraints on already relatively deregulated labour markets, the attractiveness of contracting through the gig platform would increase as well, following transaction cost minimization logic. We confirm empirically that benefits from autonomous adaptation can be outweighed by related costs and that excessive deregulation of the labour market might depress economic performance.

The paper does not address the issue of the optimal level of LMR. Our analysis considers only the possibility of gig platforms to economize transaction costs under the shadow of the institutional environment in the user and platform countries. The actual optimal level of LMR may depend on different dimensions and societal choices and is not to be inferred from the results. We believe this is a topic for future studies.

Supplementary material. The supplementary material for this article can be found at https://t.ly/-O07w.

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