Online labour markets – leveling the playing field for international service markets?

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Abstract: The Internet has long been predicted to become a shortcut that allows workers to work for any employer regardless of their location. To some extent this has now become a reality, with the rise of "online labour markets" that bring together buyers and sellers of intangible knowledge and service work from around the world. Practical considerations such as language and time zone differences can be expected to shape those markets, but a long tradition of research in international business finds that foreignness per se can also be a liability. In this paper, we use data from the largest global online marketplace to examine the degree to which geography still matters, not just for practical matters but also in terms of a persisting perception of foreignness in the online space. We find that the market is highly international, with most employers residing in rich countries and most workers in poor countries. However, workers are more likely to find work in their domestic markets. Moreover, domestic contractors get paid more than international contractors for the same type of work. Our analysis suggests that this bias against international contractors is not only due to practical factors such as time zone differences and language-based communication difficulties, but especially to what can be termed a "liability of foreignness". We conclude that while the Internet can bridge physical distance, there are also other geographically conditioned barriers to trade that digital connectivity doesn't necessarily address.

Introduction

The Internet has long been predicted to become a shortcut that allows workers to work for any employer regardless of their location. For instance, Poon and Jevons (1997: 34) state that "because the Internet creates a 'borderless' virtual business platform on which suppliers, customers, competitors and network partners can freely interact without going through the pre-defined channels on the value chain, members of the same business network or of different networks can by-pass the traditional interaction patterns and form virtual value chains". In its most extreme form, this line of thinking has claimed that networked technologies entirely eliminate frictions pertaining to barriers of proximity in global commerce (Friedman, 2005).

To some extent this prediction has now become a reality, with the rise of "online labour markets" that bring together buyers and sellers of intangible knowledge and service work from around the world. Some initial research is finding that the potential benefits of online work in terms of leveling the playing fields between providers from different contexts may be overstated (e.g. Agrawal et al. 2012; Beerepoot & Lambregts, 2014). However, the mechanisms by which domestic relative to foreign providers are advantaged or not are still poorly understood.

In this paper we argue that there are two main mechanisms by which service foreign providers are disadvantaged relative to their domestic counterparts. The first is simply practical: The internet does not dissolve such differences as language or differences in time zones, and a buyer would require some discount for having to manage that additional complexity.

The second mechanism is captured in the phrase "liability of foreignness", imported from international business research (Hymer, 1976; Zaheer, 1995). Both buyers and sellers in online marketplaces remain based in a domestic context, and those contexts present them with difficulties when they work for a foreign client, even in a digital space. We assess the liability of foreignness along three dimensions. First, we look at the complexity of work, where evidence of skills is likely to be especially important, and likely easier to obtain for domestic than for foreign providers. Second, we look at work involving formal institutions, since tasks like accounting or legal services are likely to privilege domestic providers who can be expected to have greater knowledge about domestic institutions. Finally, some work consists mainly of interacting with people (e.g., customer support, sales) or of creating text, images, or audio (copywriting, graphic design). Such communication work is likely to be shaped by informal institutions, for example the type of humour that is culturally acceptable. We argue that foreign providers will be disadvantaged relative to domestic providers across all three those dimensions.

In this paper, we test our hypotheses by analysing the complete set of actualised transaction logs (N= 61,447) mediated by the online marketplace oDesk.com in March 2013. We find that the market is highly international, with most employers residing in rich countries and most workers in poor countries. However, workers are more likely to find work in their domestic than in foreign markets. Moreover, domestic contractors get paid more than international contractors, even for the same type of work. Our analysis suggests that this bias against international contractors is

not only due to practical factors such as time zone differences and communication difficulties due to language, but especially to liability of foreignness.

We find support for all our hypotheses and strong support for those pertaining to the liability of foreignness. While the Internet and networked technologies can reduce some frictions pertaining to proximity and distance, we find that key shapers of trade are geographically grounded and signified. This suggests some caution in assessments of how internet-enabled business can support global economic participation.

The next section is organised as follows. We first position our argument in the current (mainly optimistic) assessments of the potential of digitally enabled work to allow global economic participation. We then discuss some of the practical challenges of such work, and finally we explain the arguments around "liability of foreignness" and argue that such a liability is likely to persist in the online space.

Theoretical framing and hypotheses

The Internet has long been predicted to reconfigure trade by becoming a shortcut that allowings geographically distant workers to bypass intermediaries and transact with customers directly (Malone and Laubacher 1998, UNCTAD 2003). This has especially been expected to be the case for intangible knowledge work and service work that can be delivered digitally (Autor 2001). To some extent, this vision has now become a reality. Elance.com, for instance, claim "there's a world of talented people now freelancing on Elance", whilst oDesk.com state that their platform can be used to "find, hire, and pay the world's best freelancers." Amazon's Mechanical Turk just assume the global nature of their workforce by stating that their service gives "businesses access to a diverse, on-demand, scalable workforce and gives workers a selection of thousands of tasks to complete whenever it's convenient."

In short, websites acting as "online labour markets" (Horton 2010) allow workers to offer their services as independent contractors to clients around the world. These online labour markets have emerged in parallel with new global employment patterns associated with the Internet Age (post mid-2000s), chiefly characterised by an exponential increase of internet-enabled work, reconfiguring the global division of labour while extending global value chains (Huws, 2013).

These broad patterns of change are correspondingly reflected in the way business is conducted, for example as evidenced by the increased proportion of activities outsourced by firms (Rangan & Sengul, 2009). Equally, research on service providers, notably Indian companies, is documenting that some firms are upgrading and becoming more competitive (Athreye, 2005; Pant & Ramachandran, 2012; Rosenberg, 2013) at the same time as their clients are developing the capabilities to outsource increasingly more complex tasks (Larsen, Manning, & Pedersen, 2013; Liu, Feils, & Scholnick, 2011).

In terms of supply, because of the ability of the internet to connect people in almost every corner of the planet, it has been argued that service providers will increasingly be able to operate from across the globe, with concepts of global value chain (Pietrobelli & Rabellotti, 2011) and global production (and later, innovation) network (Ernst, 2010; Ernst & Kim, 2002).

The promise of the Internet to circumvent traditional value chains, and the expectation of online labour markets to create a more level playing field for entities previously occupying disadvantaged positions, is increasingly reflected in policy discourses. Alongside changing patterns of global connectivity, e.g. the rapid growth of Internet penetration in low-income regions such as Sub-Saharan Africa, a diverse range of powerful stakeholders embrace the idea of a technology-fuelled shortcut to global trade for rapid local economic growth.

Illustrating these tendencies are examples of national governments entering into partnerships with commercial online labour market platform providers. Both the Nigerian and the Malaysian governments, for example, are collaborating with online platforms such as freelancer.com and Elance.com in order to meet specified economic targets relating to online work as outlined in ambitious ICT policies, e.g. Digital Malaysia. Other indicators of the perceived ability of the Internet and networked technologies to facilitate changes to labour markets and trade include the Rockefeller Foundation's large-scale funding initiative Digital Jobs Africa, and the World Bank's emphasis on the global economic impact of online contracting (Raja et al., 2013).

Presently, however, there is a severely limited empirical evidence base verifying the impact and patterns of global trade facilitated by online labour markets. The relatively few studies conducted portray an incomplete picture.

Drawing statistical analyses of wage and employment information published on oDesk profiles of US, UK, Indian and Philippine workers (total N=925), Beerepoot and Lambregts (2014), for example, suggest that while online marketplaces do allow for some degree of global wage convergence (in relative terms) by means of labour arbitrage, the actual financial gain of individual online workers is minimal. Relatedly, Agrawal et al. (2012), examining patterns of hiring practices on oDesk by analysing job posted (N= 1,316) by employers located in developed countries and the associated applications (N= 13,269), conclude that applicants from less developed countries are significantly less likely to get hired. While these and other studies (e.g. Caraway, 2010; Hong et al., 2013; Leung, 2014; Yoganarasimhan, 2013) thus demonstrate that the topic of online work is beginning to gain initial momentum in academic debates, we are still to understand and theorise basic mechanisms and shapers.

We argue that there are two main types of mechanisms driving how the online market is shaped. The first has to do with the practical challenges of working with people who are geographically and culturally distant. Second, we argue that the "liability of foreignness" that is experienced when entities go to another country remains a consideration online.

In terms of practical considerations, one important one has to do with language and culture. A few languages, and English especially, are emerging as linguas francas online, excluding people who are not at least reasonably competent in those languages. And even if there is a shared language, there is a well-documented risk of miscommunication between a first and second-language or two second-language speaking entities (Kuznetsov & Kuznetsova, 2014; Tenzer, Pudelko, & Harzing, 2014). This challenge is not limited to an online community, but it is important to acknowledge that it does present a likely "friction" to global trade.

Managing projects via the internet often requires creating and sustaining virtual teams or dealing with the complexity of contracting deliverables that may still be partly emerging (Knol, Berghout, & Boonstra, 2011; Sen & Shiel, 2006). As buyers weigh up the benefits of different providers, there are both benefits and disadvantages to having them located in different time zones. Challenges include how to coordinate asynchronous work, but there are also benefits like the ability to accelerate a project by using a chain of workers in different time zones. Whether or not different time zones represents a barrier for online workers is therefore likely to depend on the type of work. However, we argue that the complexity of coordination required from the buyer is likely to prejudice foreign providers.

In short, we hypothesise:

H1: Practical considerations have an effect on the globalness of online work, such that.

> *H1a:* Contractors where there is a language difference are likely to face a penalty relative to contractors in regions with the same language.
>
> *H1b:* The earnings of contractors in a different time zone are likely to differ from those in a similar time zone.

While absent from existing empirical literature on online work, we argue that the concept of 'liability of foreignness' (Hymer, 1976) is particularly well suited for examining patterns of global trade in online labour marketplaces. While originally defined as the "costs of doing business abroad" (Hymer, 1976), it has later been expounded as the disadvantages that firms face for not being from a given location (Zaheer, 1995). Liability of foreignness has been documented as functioning in subtle ways. For example, it has been demonstrated that foreign subsidiary companies operating in the US are subject to a significantly higher number of labour lawsuit than domestic firms. (Mezias, 2002).

It seems unlikely that the liability of foreignness will cease to be a concern in Internet-mediated contracting. Where buyers and sellers are from different countries, they are embedded in different institutions. Those institutions shape the "rules of the game' (North, 1990). At an explicit regulatory level, there are different professional and legal regulations in different countries that shape how certain tasks may be performed (Hollingsworth, 2000). But institutions function powerfully also through informal mechanisms. Norms, the expected behaviour of buyers and providers and other such non-regulated but nonetheless very real "rules" shape business conduct. A lack of awareness of those informal norms can easily be interpreted as a lack of competence and lead to a lack of trust. Lack of trust and resulting concerns, e.g. about the general level of competence of workers or about the enforceability of contracts, are typical "liability of foreignness" concerns (Calhoun, 2002).

Among all these factors that complicate transactions over the internet, online offshoring and outsourcing present very real business opportunities. Client firms can reduce their permanent workforce and still have access to a very large worker base. Indeed, they can tap into a much larger skills base than they could otherwise access, and can realise substantial savings in the process. Service providers, on the other hand, gain access to a much larger and more diverse client base than simply from

their home context. Especially if they are from lower income countries, they stand to benefit from "skills arbitrage"; the opportunity to provide services at a lower price than a firm from a high income country would have paid domestically, but still at a higher price than they could have earned in their lower income country.

The combination of very real opportunities and very real challenges is likely to shape this potentially global marketplace. Given the relative novelty of and associated uncertainties associated with the internet, we expect to see a general pattern similar to what has been found in the financial services industry (Zaheer & Manrakhan, 2001): A simultaneous international dispersion of relatively simple, low-value activities and domestic concentration of more complex, high value activities. This pattern is also found in the work of Nachum (2000). She found that locations (clustering, in fact) continued to matter in professional service industries where direct interaction with a service provider seemed to be beneficial. Where the interactions were less complex, locational advantages seemed to be disappearing.

Yet given the evidence that firms are acquiring the skills to outsource more complex tasks, (cf. our earlier argument), it is likely that this pattern will not be absolute, and that high skill activities will occasionally be performed by foreign workers. We however expect that foreign workers in those higher skill categories are likely to be severely affected by liability of foreignness issues. Where a job is complex, the shared language and culture of a domestic worker present real benefits. Not only does it make explicit communication easier – nuances can be much more easily understood – but it also allows for implicit communication. For example, with domestic providers, a client can interpret subtle and context-specific cues about quality (e.g. the educational institutions attended or other clients serviced). Those status cues have been demonstrated to reduce uncertainty and have financial benefits (Podolny, 2005). But client firms can less easily interpret the status cues of foreign providers who, as a result, may well be seen as lower status providers.

Similarly, a shared institutional context means that the client firm can spend less time contextualising the thinking underlying a project and it is likely easier to explain expectations to a domestic than to a foreign service provider. The power of such tacit knowledge has been extensively documented (Hamel, 1991; Kogut & Zander, 1992; Morris, Hammond, & Snell, 2014; Nonaka, 1994) and cannot be assumed in the case of foreign providers. Additionally, should a project prove to be particularly complicated, a domestic service provider and client could relatively easily arrange an in-person meeting with all the benefits of face-to-face contact. Although relationships are at least as important as geographical proximity for managing emerging processes such as innovation (Ganesan, Malter, & Rindfleisch, 2005), both options are much harder to achieve in the case of a foreign than local provider.

In short, previous research on international business suggests that when firms consider foreign service providers, they lack some important institutional, geographic and cultural information, and that the lack of information makes it harder for buyers to entrust complex work to foreign providers. . Should they decide to take on those relatively speaking less known entities, they are likely to require a discount relative to a foreign provider.

The foregoing leads us to the following hypotheses:

H2: Foreign contractors are less likely to attract business relative to domestic contractors.

> *H2a:* This gap is greater in complex work, work that directly involves formal institutions, and communication work.

H3: Foreign contractors are paid less for the same type of work relative to domestic contractors.

> *H3a:* This gap is greater in complex work, work that directly involves formal institutions, and communication work.

The next sections present our evidence.

Data and methods

It is important to acknowledge that there is a non-uniform distribution of different types of labour around the world. This research cannot account for trade that, for whatever reason, never happened in the first place. Given the caveat that this research only looks at the allocation of existing trade; we collected transaction records of all the 61,447 projects that were completed on oDesk during the month of March 2013.

These records were provided to us by oDesk in an anonymized, privacy-protected form. A variety of variables are recorded for each project in the dataset, such as the total amount of money charged from the client, the client's and contractor's geographical locations, and details on the contractors' platform-specific experiences, including feedback scores from previous clients. Based on these variables, we produced a set of measures that operationalize the concepts implicated in our hypotheses. The measures are detailed below.

Our analysis of the measures consists of three steps. In the first step, we address H2 with a counterfactual analysis, where we compare the actual distribution of work between domestic and foreign contractors with a synthetic scenario where foreignness has no influence on the outcome. In the second step, we address H2a through a binomial logistic regression analysis that reveals how the likelihood of a contractor being foreign is influenced by the type of work in question. In the final step, we address H1a and H1b, as well as H3 and H3a with hierarchical regression analyses that show how both practical considerations and foreignness influence pay. More details on the analysis methods is provided in the results section.

Dependent measures

Pay: Projects on oDesk are priced in two different ways: as fixed price projects and as hourly contracts in which the hourly rate is agreed on beforehand. We thus operationalize pay in two different ways: as the total amount of money charged from the client (total project value), and as the contractor's hourly rate. As is typical in studies of factors predicting individual earnings (e.g., Marini & Fan 1997), both measures were log-transformed. This makes the right-skewed distributions more normal and allows the coefficients in the regression models to be interpreted as percentage changes, an approximation that holds for small changes in the variable.

Foreignness: Each project on oDesk involves one client and one contractor. If the contractor's registered geographical location is in a different country than the client's registered location, then the project is flagged as involving a foreign contractor. Foreignness is used both as a dependent measure and as an independent measure to predict pay.

Independent measures

Type of work: Key concepts in our hypotheses are complex work, defined as work that involves formal institutions, and communication work. ODesk has an ontology of job types that consists of 74 bottom-level categories, including categories such as "data entry", "bookkeeping", and "video production". Each project is placed in one of these categories by the client. The ontology is thus quite detailed, but does not correspond directly with any established system of categorizing occupations or tasks. This means that we cannot simply apply an existing job characteristics model to obtain measures of project complexity or institutional embeddedness. Instead, we used the platform ontology to code the projects as follows (see Appendix 1 for the full list of categories and codes):

- All projects belonging to a category with the word "strategy", "management", or "planning" in its name, such as "software project management," were coded as *complex work.*
- All projects belonging to accounting, legal, financial, and recruitment services categories were coded as *work involving formal institutions.*
- All projects belonging to categories of work that consist mainly of interacting with people (e.g., customer support, sales) or of creating text, images, or audio (copywriting, graphic design) were coded as *communication work.*

Time difference is measured as the difference between the client's country's time zone and the contractor's country's time zone, rounded to the closest full hour. In cases where the country spans multiple time zones, we used a rough estimate of the country's center of population as the basis for choosing the time zone. In the regression analyses, time difference is treated as a factor rather than as a coefficient, because its effect is unlikely to be linear.

Language is addressed as follows. Each client and contractor was given a language code of either English, French, Spanish, Portuguese, Arabic, or "other" based on the main language of business of their country. In projects where the client and contractor had the same language code except "other", the project was flagged as a "same language" project, which was used as a factor in the analyses.

Finally, in any service market, contractor *experience* and *reputation* are likely to have a significant impact on pay (e.g. Jin and Kato, 2006; Peer et al., 2013), and so these must be included as control variables. We measure experience as the number of projects the contractor has completed previously. Its distribution is right-skewed (many projects have contractors with little experience), so we normalize it with a log-transformation. Reputation is measured as the mean of feedback scores given to a contractor by previous clients, on a scale from 1 to 5. Since its distribution is left-skewed (many contractors have close to 5-star ratings), we reflect and log-transform it.

Results

We present our results in the following ways: We present some descriptive evidence, and then do a counterfactual analysis to uncover a revealed preference to test H2 around the likelihood that domestic employees are more likely than foreigners to obtain work. H3, arguing that the pay received by foreign contractors is less than received by domestic contractors, as well as hypothesis H1a and H1b relating to practical considerations, language and time zone, are tested using a multiple regression model.

Foreignness and amount of work by value

The total trade volume on oDesk in March 2013 was over 30 million US dollars. Table 1 shows the top buyer and seller countries by volume and their relative market shares. The market is highly international: 89.0 percent of the trade measured by value happened between a client and a contractor who were in different countries. In absolute terms, the vast majority of work is thus performed by foreign contractors, due to their sheer numbers. This is an interesting finding in itself. But how about in relative terms – does an individual foreign contractor stand the same chance of attracting trade from the market as a domestic competitor?

Table 1. Top buyer and seller countries and their market shares relative to the top country, March 2013

	Buyer country	Purchases	Seller country	Sales
1	United States	100.0%	India	100.0%
2	Australia	14.6%	Philippines	68.5%
3	Canada	9.0%	United States	58.6%
4	United Kingdom	8.0%	Ukraine	37.1%
5	UAE	4.5%	Pakistan	24.5%
6	Germany	2.0%	Bangladesh	21.4%
7	Netherlands	1.8%	Russia	21.2%
8	Israel	1.5%	China	18.2%
9	France	1.5%	Poland	8.5%
10	Sweden	1.1%	Canada	7.0%
11	Norway	1.0%	United Kingdom	6.3%
12	Denmark	0.9%	Belarus	6.1%
13	Switzerland	0.8%	Romania	4.4%
14	Belgium	0.7%	Egypt	3.6%
15	Malaysia	0.7%	Argentina	2.9%
16	Spain	0.6%	Moldova	2.9%
17	Ireland	0.6%	Armenia	2.9%
18	Singapore	0.5%	Australia	2.9%
19	India	0.5%	Serbia	2.8%
20	New Zealand	0.5%	Italy	2.7%

We can address this question by calculating a counterfactual scenario where geography has no influence on sales, and then compare the result with how sales are actually distributed. In our counterfactual scenario, each contractor's sales are distributed around the world strictly in proportion to the buyer countries' relative market sizes. Of the approximately $30 million worth of work sold to the market during the time period covered by our data, 8.4 percent involves buyers located in the same country as the contractor. Most of this incidental domestic trade is attributable to the fact that the United States is both a large seller country as well as the largest buyer country in the market. If we then compare this counterfactual scenario with how sales are actually distributed, we find that the actual volume of domestic sales is 11.0 percent of the global market. In other words, the actual volume of domestic trade is almost one third greater than what we would expect it to be if geography played no part (11.0 percent / 8.4 percent = 1.31). Domestic contractors' odds of attracting business are consequently also almost one third greater. Conversely, foreign contractors' odds of attracting business are slightly reduced (89 percent / 91.6 percent = 0.97). As a result, a foreign contractor is only 0.74 times as likely to attract business as a domestic contractor is (odds ratio: 0.97 / 1.31 = 0.74). Even given how international this market is, H2 is supported.

Are there differences in the types of business awarded to domestic and foreign contractors? We hypothesized that foreign contractors are less likely to obtain complex work, work that directly involves formal institutions, and communication work. A binomial logistic regression model testing the influence of these factors is presented in Table 2, under Model 1. It shows that a foreign contractor is about two thirds as likely to conduct complex work and one third as likely to conduct work involving formal institutions as a domestic contractor is. It also shows that a foreign contractor is about half as likely to conduct communication work. To what extent are these results attributable to simple language differences rather than more subtle questions of institutional embeddedness? Model 2 shows the same analysis performed on a subset of the data that includes only those transactions where the main language of business in the buyer's country and the contractor's country is the same. Foreign contractors' odds are improved slightly, but the overall pattern is the same. H2a is thus supported.

Table 2. Logistic regression models predicting award of contract to foreign contractor (odds ratios and 95% confidence intervals)

	Model 1	Model 2
complex work	0.64	0.71
	[0.41; 0.88]	[0.47; 0.95]
formal institutions	0.27	0.33
	[0.09; 0.45]	[0.15; 0.52]
communication work	0.58	0.62
	[0.53; 0.64]	[0.56; 0.68]
AIC	39101.16	34101.21
BIC	39137.27	34135.97
Log Likelihood	-19546.58	-17046.61
Deviance	39093.16	34093.21
Num. obs.	61447	43907

Practical considerations and liability of foreignness: In hourly rates

When foreign contractors do win contracts, do they get paid the same as their domestic competitors? Services purchased on oDesk are priced in two different ways: as fixed price projects and as hourly contracts in which the hourly rate is agreed on beforehand. The two types are approximately equally common, but foreign contractors are slightly more likely to be engaged on hourly contracts than domestic contractors are (χ^2=118.39, p<.001). On average, foreign contractors' hourly rate is significantly lower than that of domestic contractors (p<.001): foreign contractors earn an average of $11.66 per hour (sd=11.20), while domestic contractors' average rate is $24.13 (sd=38.30).

The most obvious factor influencing pay is the type of work conducted. Jobs that call for relatively undifferentiated labour, such as transcription and data entry, are likely to be priced much lower than jobs that require highly skilled or regulated labour, such as software project management or legal advice. In some contexts, jobs that are associated with the female gender role can pay less than jobs perceived as more masculine (Marini & Fan 1997, Lips 2003). These possible sources of variation are captured by controlling for the type of job.

In addition to these elements relating to foreignness, practical considerations also matter. We hypothesized that language (H1a) and time differences (H1b) would have an effect on market outcomes. How do these variables play out? As expected, time difference has a significant effect in both models in Table 3. H1b is thus supported. But as can be seen in Appendix 2, the effect is quite nuanced. In some cases, providers earn more for being in a different time zone, and in other cases less. On the one hand, it is easier to work with contractors whose working hours more easily match those of the buyers, but on the other hand, a provider from another region may allow for especially fast turnaround. This merits further examination.

However, Table 3 shows that language did not have a statistically significant effect in our analyses. H1a is thus not supported. It may be that the measure was too crude, but because we look only at concluded transactions, it could also be that a selection process had already taken place: A buyer can assess language capability during the bidding process, and people whose language capability is too limited may simply not get the work. This is discussed more in the conclusions section.

Do these practical considerations account for the difference in pay between foreign and domestic contractors, or do the liability of foreignness considerations also play a role? We tested this with a regression analysis that is summarized in Table 3, under Model 1 and included the contractor's level of experience and reputation among clients as important control variables. The model indicates that foreignness remains a very significant predictor of hourly earnings, in statistical as well as practical terms. Other things being the same, a foreign contractor's rate is only exp(-0.81) = 0.44 times that of a domestic contractor. The model is able to explain almost half of the variance in rates (R^2=.46). H3 is thus supported.

Table 3. Regression models predicting log of contractor's hourly rate (coefficients and standard errors)

	Model 1	Model 2
(Intercept)	2.78 (0.31)***	2.72 (0.31)***
type of job (73 contrasts omitted)	***	***
time difference (35 contrasts omitted)	***	***
same language	-0.04 (0.02)	-0.04 (0.02)
contractor experience	0.13 (0.00)***	0.13 (0.00)***
contractor reputation	0.15 (0.01)***	0.15 (0.01)***
contractor foreign	-0.81 (0.04)***	-0.74 (0.04)***
contractor foreign AND complex work		-0.45 (0.10)***
contractor foreign AND formal inst.		-0.23 (0.08)**
contractor foreign AND comm. work		-0.10 (0.03)**
R^2	0.46	0.46
Adj. R^2	0.46	0.46
Num. obs.	22507	22507

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$

We hypothesized that the liability of foreignness in rates would be greater in complex work, work that directly involves formal institutions, and communication work. We test this with Model 2 in Table 3, which differs from Model 1 in that it includes an interaction term for each of these three types of work and foreignness. The model indicates that foreign contractors incur a significant additional rate penalty in these three types of work, especially complex work. H3a is thus supported. This additional penalty is slightly compensated by a reduced overall foreignness penalty. The share of variance explained (R^2) is not improved, as variance simply shifted from one explanation to others.

Practical considerations and liability of foreignness: In total project value

Besides hourly rates, we can also examine total project value. The average total value of a project in the data is somewhat lower for foreign contractors (m=$526.12, sd=2954.92) than it is for domestic contractors (m=$576.21, sd=3088.75), but the value varies greatly from project to project, and this difference is not generalizable beyond the data (p=.233). To get a better idea of what factors influence project value and whether foreignness is one of them, we conduct similar analyses to those we conducted above for hourly rates. The results are summarized in Table 4, and adds robustness to our findings.

Model 1 shows that, as in the case of hourly rates, the practical reality of time zones is significant, but not language. Again there is a significant liability of foreignness in total project value that is not explained by differences in job types, experience, or reputation. Other things being the same, a foreign contractor's average project is worth exp(-0.77) = 0.46 times that of a domestic contractor. H2 is thus supported, with the caveat that our model is only able to explain a small portion of the variance in project values (R^2=.08). A large portion of the unexplained variation in value is likely due to large differences in project sizes, which are not included in the model.

Table 4. Regression models predicting log of total project value (coefficients and standard errors)

	Model 1	Model 2
(Intercept)	4.08 (2.11)	3.85 (2.11)
type of job (73 contrasts omitted)	***	***
time difference (35 contrasts omitted)	***	***
same language	-0.06 (0.04)	-0.05 (0.04)
contractor experience	0.09 (0.01)***	0.09 (0.01)***
contractor reputation	0.19 (0.02)***	0.19 (0.02)***
contractor foreign	-0.77 (0.08)***	-0.45 (0.09)***
contractor foreign AND complex work		-0.74 (0.26)**
contractor foreign AND formal inst.		-0.68 (0.20)***
contractor foreign AND comm. work		-0.47 (0.06)***
R^2	0.08	0.08
Adj. R^2	0.08	0.08
Num. obs.	48392	48392

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$

Model 2 in Table 4 adds interaction terms between foreignness and complex work, work that directly involves formal institutions, and communication work. The model shows that the liability of foreignness is significantly greater in these job types. H2a is thus supported. The overall liability correspondingly drops, but remains significant.

Conclusions and discussion

The potential clearly exists for workers in low-income countries to use online labour markets to match their skills with job opportunities created abroad. In our dataset, af full 89 percent of work (as measured by value) on oDesk is offshored. Almost all of the top 20 buyer countries are rich countries, while almost all of the top 20 seller countries are low- or medium-income countries. Online labour markets are thus almost certainly contributing to the earnings of many people in low-income countries, and may even be a mechanism by which workers from lower income countries can earn larger incomes.

However, our findings suggest that online labour markets are unlikely to close earnings gaps between countries entirely. Even in the delocalized marketplace of oDesk, a liability of foreignness persists: foreign contractors were found to attract less work and be paid less for the same type of work than their domestic competitors. This liability was found to be greater in complex work, work that involves formal institutions, and communication work, but it is noteworthy that it also existed in work that didn't belong to these categories. An institutional interpretation of these findings is that foreign contractors are embedded in different formal and informal institutional contexts than their clients, and as a result are not as able to perform tasks or convince clients of their ability to perform tasks to the same degree as their domestic competitors are. While online labour markets are able to overcome the practical challenge of employers and workers finding each other across distance, they don't

quite amount to "virtual migration" (Horton 2010), since workers remain bound to their local institutions, customs, and cultural assumptions.

Liability of foreignness does not have the same impact on all contractors. Contractors in countries with large domestic markets benefit from the preference towards domestic contractors more than sellers in countries with small domestic markets. For example, Australian and Pakistani contractors on oDesk enjoy a similar edge in winning contracts in their home markets in relative terms, but the difference in the absolute sizes of the markets means that Australian contractors benefit from this edge much more. Without the edge, Australian contractors would be expected to earn 9.2 percent of their income from their home market, but thanks to the edge, the actual share is 47.3 percent. In contrast, Pakistani contractors only earn 0.3 percent of their actual income from the domestic market, versus 0.07 percent expected. Even a uniform liability of foreignness in relative terms therefore gives an absolute edge to contractors from large economies with ample demand.

Some significant limitations must be acknowledged in our methods. One methodological limitation is that our measures of time and language differences are currently not very sophisticated. Perhaps partly because of this, the language term does not have a statistically significant effect in any of the models in Table 3 and Table 4. We did, however, try similar analyses using contractors' self-reported English proficiency scores, with similar results. It is possible that any variation attributable to language differences is subsumed in the variation attributable to time zone differences. It is also possible that language does not play a decisive role on oDesk. The user interface is offered in English, and project descriptions and profiles are expected to be written in English. Clients and contractors looking to conduct business in other languages may be screening themselves out already at this stage and converging on a different platform. This makes it all the more notable that foreignness has a significant impact in our analyses.

We find significant evidence that time zones affect earnings, but in a very nuanced way. In certain cases, time zone differences have a positive effect, and in other cases a negative effect. This suggests that work may be evolving to take advantage of the possibilities of the internet, for example, where rapid turnaround is required, or a chain of workers, time zones may be beneficial to workers. In contrast, where the virtual equivalent of "face-to-face" contact is required, time zone differences impose a cost on a project and is likely to reflect in lower earnings for service providers. This is a potentially very interesting avenue for future research.

An especially important limitation is that our counterfactual analysis does not take into account the non-uniform distribution of different types of labour around the world. It also only looks at the allocation of existing trade; it cannot account for trade that never happened in the first place because of the liability of foreignness. Subsequent research on online labour markets should look at specific countries and patterns in transnational online labour trade: what more complex patterns of advantage and disadvantage can be discerned beyond domestic versus foreign, and whether such patterns could likewise be accounted for using institutional reasoning -- for example, historical institutional connections between colonizers and colonized, and lingering tacit knowledge.

Our hope is that this baseline finding can be used as a starting point for further questions about where specific kinds of value are created and captured (for instance, examining the role of historical institutional connections and the role of geographically embedded and tacit knowledge), and how, or whether, workers in low-income countries might be able to circumvent the liability of foreignness that we have shown to exist in online marketplaces. Until then, this work has demonstrated that online labour markets *alone* are not a perfect leveller. They have done much to connect demand with supply of work, but continue to reproduce some of the inequalities that persist in global trade.

References

Agrawal, A., Lacetera, N., & Lyons, E. (2012). How Do Online Platforms Flatten Markets for Contract Labor? Working Paper. University of Toronto, Toronto. http://andrewkarpie.com/wordpress/wp-content/uploads/2012/06/OLLaborPlat.pdf

Autor, D. (2001) Wiring the labor market. Journal of Economics Perspectives 15.

Athreye, S. (2005). The Indian software industry and its evolving service capability. *Industrial and Corporate Change*, *14*, 393–418.

Beerepoot, N., & Lambregts, B. (2014). Competition in online job marketplaces: towards a global labour market for outsourcing services? *Global Network*s, doi:10.1111/glob.12051

Calhoun, M. (2002). Unpacking the liability of foreignness: identifying culturally driven external and internal sources of liability for the foreign subsidiary. *Journal of International Management*, *8*, 301–321.

Caraway, B. (2010). Online labour markets: an inquiry into oDesk providers. *Work Organisation, Labour and Globalisation*, 4(2), 111–125.

Daft, R. L., & Lengel, R. H. (1986). Organizational information requirements, media richness and structural design. *Management Science*, *32*(5), 554–571.

Davis-Blake, A., and Broschak, J. P., 2009. Outsourcing and the Changing Nature of Work. Annual Review of Sociology 35: 321-340.

Ernst, D. (2010). Upgrading through innovation in a small network economy: insights from Taiwan's IT industry. *Economics of Innovation & New Technology*, *19*, 295–324.

Ernst, D., & Kim, L. (2002). Global Production Networks, Knowledge Diffusion, and Local Capability Formation. *Research Policy*, *31*, 1417–1429.

Friedman, T. (2005) The world is flat: a brief history of the twenty-first century. New York: Farrar, Straus & Giroux.

Ganesan, S., Malter, A. J., & Rindfleisch, A. (2005). Does distance still matter? Geographic proximity and new product development. *Journal of Marketing*, *69*(4), 44–60.

Gereffi, Gary. (1994) The Organization of Buyer-Driven Global Commodity Chains: How US Retailers Shape Overseas Production Networks. *Contributions in Economics and Economic History*, 95–95.

Hamel, G. (1991). Competition for Competence and Inter-Partner Learning Within International Strategic Alliances. *Strategic Management Journal*, *12*, 83–103.

Hollingsworth, J. R. (2000). Doing institutional analysis: implications for the study of innovations. *Review of International Political Economy*, *7*, 595–644.

Hong, Y. and P. A. Pavlou (2013). Online Labor Markets: An Informal Economy. IBIT Report, February 2013. Available at SSRN: http://ssrn.com/abstract=2132869

Horton, J. (2010) Online Labor Markets. In: *Internet and Network Economics: 6th International Workshop, Proceedings.* Berlin: Springer. http://john-joseph-horton.com/papers/online_labor_markets.pdf

Huws, U. (2013). Working online, living offline: labour in the Internet Age. *Work Organisation, Labour and Globalisation*, 7(1), 1–11.

Hymer, S. (1976). *The international operations of national firms: A study of direct foreign investment*. Cambridge MA: MIT Press.

Jin, G. Z., & Kato, A. (2006). Price, quality, and reputation: evidence from an online field experiment. *The RAND Journal of Economics*, 37(4), 983–1005.

Kaplinsky, R. and Morris, M. (2001) *A Handbook for Value Chain Analysis*. International Development Research Centre: Ottawa.

Knol, A. J., Berghout, E., & Boonstra, A. (2011). Attributes of Communication Quality in Business Process Outsourcing Relationships: Perspectives from India-Based Insourcing Managers. *International Journal on IT/Business Alignment and Governance*, 2(1), 35–55. doi:10.4018/jitbag.2011010103

Kogut, B., & Zander, U. (1992). Knowledge of the firm and the evolutionary theory of the multinational corporation. *Journal of International Business Studies*, 24, 625–645.

Kuznetsov, A., & Kuznetsova, O. (2014). Building professional discourse in emerging markets: language, context and the challenge of sensemaking. *Journal of International Business Studies*, 45(5), 583–599.

Larsen, M. M., Manning, S., & Pedersen, T. (2013). Uncovering the hidden costs of offshoring: the interplay of complexity, organizational design, and experience. *Strategic Management Journal*, 34(5), 533–552. doi:10.1002/smj.2023

Lips, H. M. (2003). The Gender Pay Gap: Concrete Indicator of Women's Progress Toward Equality. *Analyses of Social Issues and Public Policy*, 3(1), 87–109. doi:10.1111/j.1530-2415.2003.00016.x

Liu, R., Feils, D. J., & Scholnick, B. (2011). Why are different services outsourced to different countries? *Journal of International Business Studies*, 42(4), 558–571. doi:10.1057/jibs.2010.61

Leung, M. D. (2014). Dilettante or Renaissance Person? How the Order of Job Experiences Affects Hiring in an External Labor Market. *American Sociological Review*, 79(1), 136–158. doi:10.1177/0003122413518638

Malone, T.W., Laubacher, R.J. (1998) The dawn of the e-lance economy. Harvard Business Review 76(5), 144–152.

Marini, M. M. and P.-L. Fan. 1997. The gender gap in earnings at career entry, *American Sociological Review*, 62(4):588-604.

Mezias, J. M. (2002). Identifying liabilities of foreignness and strategies to minimize their effects: The case of labor lawsuit judgements in the United States. *Strategic Management Journal*, 23(3), 229–244.

Morris, S., Hammond, R., & Snell, S. (2014). A microfoundations approach to transnational capabilities: The role of knowledge search in an ever-changing world. *Journal of International Business Studies*, 45(4), 405–427. doi:10.1057/jibs.2014.6

Nachum, L. (2000). Economic geography and the location of TNCs: Financial and professional service FDI to the USA. *Journal of International Business Studies*, 31, 367–385.

Nonaka, I. (1994). A Dynamic Theory of Organizational Knowledge Creation. *Organization Science*, *5*, 14–37.

North, D. C. (1990). *Institutions, Institutional Change and Economic Performance*. New York: Cambridge University Press.

Pant, A., & Ramachandran, J. (2012). Legitimacy beyond borders: Indian software services firms in the United States, 1984 to 2004. *Global Strategy Journal*, *2*(3), 224–243. doi:10.1111/j.2042-5805.2012.01037.x

Peer, E., Vosgerau, J., & Acquisti, A. (2013). Reputation as a sufficient condition for data quality on Amazon Mechanical Turk. *Behavior Research Methods,* 1–9.

Pietrobelli, C., & Rabellotti, R. (2011). Global value chains meet innovation systems: are there learning opportunities for developing countries? *World Development*, *39*, 1261–1269. doi:10.1016/j.worlddev.2010.05.013

Podolny, J. M. (2005). *Status signals*. Princeton: Princeton University Press.

Poon, Simpson, and Colin Jevons. "Internet-Enabled International Marketing: A Small Business Network Perspective." *Journal of Marketing Management* 13 (1997): 29–41.

Porter, M. E. (1985) *Competitive Advantage*. The Free Press: New York.

Raja, S.; Imaizumi, S.; Kelly, T.; Narimatsu, J.; Paradi-Guilford, C. (2013). Connecting to work: how information and communication technologies could help expand employment opportunities. Washington DC: World Bank.

Rangan, S., & Sengul, M. (2009). Information technology and transnational integration: Theory and evidence on the evolution of the modern multinational enterprise. *Journal of International Business Studies*, *40*, 1496–1514.

Rosenberg, N. (2013). Sources of Innovation in Developing Economies: Reflections on the Asian Experience. *Seoul Journal of Economics*, *26*(3), 283–309.

Sen, F., & Shiel, M. (2006). From business process outsourcing (BPO) to knowledge process outsourcing (KPO): Some issues. *Human Systems Management*, *25*(2), 145–155.

Tenzer, H., Pudelko, M., & Harzing, A.-W. (2014). The impact of language barriers on trust formation in multinational teams. *Journal of International Business Studies*, *45*(5), 508–535.

UNCTAD. *E-Commerce and Development Report*. UNCTAD/SIDTE/ECB/2003/1. Geneva: United Nations, 2003.

Yoganarasimhan, H. (2013). The Value of Reputation in an Online Freelance Marketplace. *Marketing Science*, 32(6), 860–891.

Zaheer, S. (1995). Overcoming the liability of foreignness. *Academy of Management Journal*, *38*, 341–363.

Zaheer, S., & Manrakhan, S. (2001). Concentration and Dispersion in Global Industries: Remote Electronic Access and the Location of Economic Activities. *Journal of International Business Studies*, *32*, 667–686.

Appendix 1: Job types

Job type	Complex work	Formal inst.	Comm. work
3D Modeling & CAD			
Accounting		1	
Advertising			1
Animation			1
Application Interface Design			1
Audio Production			1
Blog & Article Writing			1
Bookkeeping		1	
Business Consulting			
Business Plans & Marketing Strategy	1		
Copywriting			1
Creative Writing			1
Customer Service & Support			1
Data Entry			
DBA - Database Administration			
Desktop Applications			
Ecommerce			
Email Marketing			1
Email Response Handling			1
Engineering & Technical Design			
ERP / CRM Implementation			
Financial Services & Planning	1	1	
Game Development			
Graphic Design			1
HR / Payroll		1	
Illustration			1
Legal		1	
Logo Design			1
Market Research & Surveys			1
Mobile Apps			
Network Administration			
Order Processing			
Other - Administrative Support			
Other - Business Services			
Other - Customer Service			1
Other - Design & Multimedia			1
Other - Networking & Information Systems			

Other - Sales & Marketing			1
Other - Software Development			
Other - Web Development			
Other - Writing & Translation			1
Payment Processing		1	
Personal Assistant			1
Phone Support			1
PR - Public Relations			1
Presentations			1
Print Design			1
Project Management	1		
Recruiting		1	1
Sales & Lead Generation			1
Scripts & Utilities			
SEM - Search Engine Marketing			
SEO - Search Engine Optimization			
Server Administration			
SMM - Social Media Marketing			1
Software Plug-ins			
Software Project Management	1		
Software QA			
Statistical Analysis			
Technical Support			1
Technical Writing			1
Telemarketing & Telesales			1
Transcription			
Translation			
UI Design			1
Video Production			1
Voice Talent			1
VOIP			
Web Design			1
Web Programming			
Web Research			
Website Content			1
Website Project Management	1		
Website QA			

Appendix 2: Time difference coefficients for Table 3

Time diff.	Model 1	Model 2
-17	0.30 (0.31)	0.30 (0.31)
-16	0.12 (0.56)	0.12 (0.56)
-15	0.13 (0.31)	0.13 (0.31)
-14	-0.36 (0.41)	-0.36 (0.41)
-13	0.03 (0.38)	0.03 (0.38)
-12	-0.48 (0.43)	-0.47 (0.43)
-11	0.34 (0.35)	0.35 (0.35)
-10	0.02 (0.31)	0.03 (0.31)
-9	0.03 (0.32)	0.04 (0.32)
-8	-0.31 (0.31)	-0.30 (0.31)
-7	-0.07 (0.31)	-0.07 (0.31)
-6	-0.56 (0.31)	-0.56 (0.31)
-5	-0.55 (0.30)	-0.55 (0.30)
-4	-0.68 (0.30)[*]	-0.68 (0.30)[*]
-3	-0.66 (0.32)[*]	-0.66 (0.32)[*]
-2	-0.56 (0.30)	-0.56 (0.30)
-1	-0.24 (0.31)	-0.24 (0.31)
0	-0.65 (0.30)[*]	-0.65 (0.30)[*]
1	-0.29 (0.31)	-0.29 (0.31)
2	-0.17 (0.30)	-0.16 (0.30)
3	-0.65 (0.31)[*]	-0.65 (0.31)[*]
4	-0.53 (0.30)	-0.53 (0.30)
5	-0.72 (0.30)[*]	-0.72 (0.30)[*]
6	-0.71 (0.30)[*]	-0.71 (0.30)[*]
7	-0.20 (0.30)	-0.20 (0.30)
8	-0.60 (0.30)[*]	-0.59 (0.30)[*]
9	-0.46 (0.31)	-0.46 (0.31)
10	-0.60 (0.30)[*]	-0.60 (0.30)[*]
11	-0.75 (0.30)[*]	-0.76 (0.30)[*]
12	-0.62 (0.30)[*]	-0.62 (0.30)[*]
13	-0.83 (0.30)[**]	-0.83 (0.30)[**]
14	-0.57 (0.43)	-0.57 (0.43)
15	-0.71 (0.30)[*]	-0.71 (0.30)[*]
17	0.22 (0.31)	0.22 (0.31)
19	0.60 (0.34)	0.63 (0.34)