Surviving and Thriving in Online Labor Markets: A Geoeconomic Analysis

Irfan E. Kanat[1]*, Yili (Kevin) Hong, T. S. Raghu*

Abstract

Online labor markets (OLM) lower the barriers of entry and enable global competition for IT service providers around the world. Although the prior OLM literature posits systematic advantages to IT service providers from developed countries, most providers in OLM are from developing countries. The jobs are flowing to the developing countries, while the employers remain in the developed countries. This emerging evidence requires fresh analysis to understand how OLMs are evolving. In this study, we conduct a geoeconomic analysis on IT service providers' survival and wage growth, utilizing a unique longitudinal panel data set comprising 40,874 IT service providers from 150 different countries over a period of more than four years (2006 to 2010). Using *Survival* and *Growth* models, we uncover systematic advantages for IT service providers from developing countries in both survival and wage growth. We are also able to decipher trends in how these effects evolve over time as the marketplace matures. Contrary to prior literature on OLM reporting systematic advantages for IT service providers from developed countries in landing contracts, we found a systematic advantage for IT service providers from developing countries in terms of both survival and wage growth, especially when they were able to signal their individual quality. We explain and discuss the mechanisms underlying these effects, and highlight implications for online labor markets for IT services.

Keywords: Online labor markets, survival, wage growth

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1 Introduction

Online labor markets (OLMs) are matching platforms that bring together employers and on-demand service providers. The role of OLMs in today's economy is steadily growing as OLM is projected to provide some 72 Million full-time-equivalent positions by 2025 (Manyika et al. 2015). OLMs flatten market hierachies, reduce transaction costs, and open up tasks and services that were once local jobs to global competition (Malone et al. 1987; The Economist 2010). The advanced technologies and reduced transaction costs make moving jobs to places with cost advantages more viable (Moreno and Terwiesch 2014). As the jobs move to developing countries, developed countries will face pressure on wages and jobs (Blinder 2006; Bottini et al. 2007). This means as market evolves, the power and number of providers from developed versus developing countries (herein referred to as "market structure" (Jacquemin 1972)) may change. Yet, relatively little is known about the mechanisms that affect the market structure in developed versus developing countries in OLM.

IT job security and wages in developed countries are threatened when firms outsource their IT services to developing countries (Aspray et al. 2006; Tambe and Hitt 2010). OLM is a disruptive force in labor markets since it allows small firms and even individuals to outsource IT jobs and services, and they allow any IT service provider[2] to compete for those jobs (Manyika et al. 2015; Moreno and Terwiesch 2014). Despite the growing importance of OLMs, especially their ability to bring together employers and providers from around the globe, OLM research that addresses the geoeconomic mechanisms is lacking. The existing studies on OLM have primarily focused on reputation and signaling mechanisms to study the employers' hiring decisions when they receive quotes from providers from different countries (Chan and Wang 2014; Hong and Pavlou 2014; Mill 2011; Scholz and Haas 2011). This line of inquiry has identified systematic hiring biases benefiting providers from developed countries, as they may be perceived to have higher quality (Agrawal et al. 2013b; Hong and Pavlou 2014; Mill 2011). However, these studies ignored the interplay between individual reputation, geoeconomics, and market maturity, which jointly determine both the providers' survival and their wages growth. In this study,

[2]We herein refer to IT service providers as "providers" in this paper

we aim to address this research gap by focusing on how individual reputation, economic development conditions and market maturity shape the market structure in OLM. Specifically, our study looks at two aspects of market structure in OLM: (1) We investigate systematic difference in survival for providers from developed and developing countries, and investigate the economic and perceptual drivers of this difference; (2) We look at differences in wage growth between developed and developing countries. Taken together, these two aspects offer us a comprehensive picture on market structure in OLM.

One dimension of market structure we seek to examine is provider survival. The survival of providers as supply-side market participants is of key importance to understand job losses and gains in labor markets. If there are mechanisms that favor provider's from certain countries, we would expect the distribution of labor to shift to favor these countries as more providers from these countries will flock to and remain on the market. Survival of providers, however, has received relatively little attention from IS community (Banker et al. 2011). One possible reason for this apparent void in the literature is the difficulty of observing the providers' survival in the market, since the data is usually proprietary and hard to be observed on scale. Utilizing a proprietary dataset that provides login activity of users, we were able to overcome this difficulty and reliably measure survival and market exit. We base our analysis on a unique data set that combines proprietary transaction and user login data for providers from a global online labor market, exchange rate data from IMF, and GDP data for the providers' countries of residence from the World Bank. We construct a longitudinal panel data set comprising 40,874 providers from 152 countries in a leading global online labor market over a period of four years and nine months between 2006 and 2010. We used a time variant survival model to see the effect of development level on provider survival (Thomas and Reyes 2014). We found that: (1) developing country providers are more likely to survive, (2) reputation had a more significant effect on the survival of providers from developing countries, compared with providers from developed countries.

The other key dimension of market structure is wage growth, which has been of keen interest to researchers (John M. Barron 1987; Kim et al. 2014). Wage growth

offers insights into the trajectory of the competition dynamics, i.e., how market power changes over time for providers from different countries. In this paper, we investigate wage growth in the new context of OLM with a random coefficients growth model (Bliese and Ployhart 2002). Contrary to the outsourcing literature's findings that developing countries will only compete by undercutting the prices in traditional labor markets (Blinder 2006), our findings reveal that developing country providers are able to command a higher wage and on average see higher growth in their wage compared to their counterparts in developed countries in OLM.

This paper makes several important contributions. First, our findings support and expand the outsourcing literature on job and wage dynamics into the new context of OLM (Aspray et al. 2006; Blinder 2006; Bottini et al. 2007; Feenstra and Hanson 1999), which promises significance in today's economy. We found a systematic advantage for developing countries in both provider survival and their wage growth. Beyond what outsourcing literature has foretold, we found evidence of developing country providers commanding higher wages. Second, we conduct a pioneering analysis on survival of providers in OLM. This study contributes to the literature by looking at the interplay between country economic development and and provider reputation. We found that providers from developing countries benefit more from a better reputation when it comes to survival. Third, this study expands the emerging IS literature on OLM. While most of the current studies of online labor markets have squarely focused on the employers' hiring decisions (Banker and Hwang 2008; Malone and Laubacher 1999; Moreno and Terwiesch 2014; Scholz and Haas 2011; Tambe and Hitt 2010; Yoganarasimhan 2013) by looking at the factors that determine which provider gets a contract, our study expands this line of research by conducting a provider-level analysis of survival and wage growth in OLM.

This paper proceeds as follows. Section 2 describes the background and related literature. Section 3 develops the hypotheses, which sets the foundation for empirical testing. Section 4 presents the data, estimation models and results. Finally, Section 5 discusses this study's contributions and implications for theory and practice.

2 Related Literature

In this section, we review related literature on outsourcing and OLM.

2.1 Outsourcing and Offshouring of IT Services

Prior research on off-shoring and outsourcing directly motivates our work. Traditionally, outsourcing of jobs to geographically distant locations was only possible for those that manufacture goods that can be shipped (Blinder 2006). Hence, the first batch of jobs to be outsourced offshore were manufacturing jobs, for which companies set up offshore factories to leverage cheaper labor. The rule it seemed at the time was: 'if you can ship it, you can offshore it'. With the development of Internet and virtual collaboration technologies, now we are at a stage where *service jobs* that are non-commodity in nature, such as software development, call center, or radiology diagnosis are being offshore outsourced (Blinder 2006). In general, given the economic gravity, the jobs flow from the developed countries to the developing countries as the labor flows from the poor to the rich, leading to the natural pattern that the employers reside in developed countries, and the workers in the developing countries, thus shaping the labor market structure (Mill 2011).

IT services were among the first to be outsourced, thanks to the impersonal and technological nature of the work (Aspray et al. 2006; Tambe and Hitt 2012, 2010). The emergence of online outsourcing markets that match providers to employers took offshore outsourcing from the domain of the Fortune 500 companies and brought it to the mass market (Malone and Laubacher 1999; Moreno and Terwiesch 2014). Nowadays even small firms can outsource their IT jobs to providers abroad. This is evident in the sharp increase in the number of providers from developing countries (and employers from developed countries), and the growth of online job matching platforms (Agrawal et al. 2013a).

Previous literature has identified cost savings as the major motivation behind outsourcing of jobs (Ang and Straub 1998; Feenstra and Hanson 1999; Scholz and Haas 2011). The savings in production costs combined with reduction in transaction costs due to technological advancements has, according to some, created a level playing field, where providers from around the world could compete on equal footing

(Friedman 2006). This was the so called flat world phenomenon. The effects on developed country labor markets were expected to be (1) *loss of jobs* (Grossman and Rossi-Hansberg 2008) and/or (2) *downwards pressure on wages* (Feenstra and Hanson 1999).

Empirical data, however, have revealed that the truth was a bit more complicated than what the flat world believers might think (Gefen and Carmel 2008). For example, a well-adopted lens was looking at the flat-world problem through examining employers' hiring decisions. Important factors beyond cost considerations come into play when the employers make a hiring decision. India's greatest advantage among many other low cost countries, for instance, was availability of a well educated English speaking work force (Aspray et al. 2006). Time zone differences, geographical distance and cultural similarities have all been found to be salient in outsourcing and in global online labor markets (Hong and Pavlou 2014). We extend this literature by investigating the impact of online outsourcing platforms on the provider survival from a geoeconomic stand point.

2.2 Online Labor Markets

The OLM reduce the transaction costs of contracting IT work, thus allowing providers from all around the world to compete for IT contracts (Agrawal et al. 2013b). However, the spatial and temporal distances between employers and providers make global online labor markets susceptible to adverse selection (lack of ex ante face-to-face screening) and moral hazard (lack of ex post monitoring) (Hong and Pavlou 2014). Mechanisms to mitigate asymmetric information in OLM has been of interest to researchers from economics, management, and IS.

These mechanisms mainly involve the signals buyers receive regarding the individual providers' past performance in the OLM. Below we provide a brief overview of research on these signals. Yoganarasimhan (2013) using a structural model to address the under estimation of reputation effects found that reputation increased likelihood of providers getting hired and having higher earnings. Banker and Hwang (2008) investigates effect of past performance (bids, contracts, etc.) on accounting service providers' compensation. Analysing data from e-lance the authors found

that signals based on past performance was significantly related to price they can charge. Using two natural experiments, Goes and Lin (2012) investigated the effect of certifications on providers' ability to obtain contracts and the drivers of providers' certification seeking behavior. Most studies in this research stream investigated buyers' choice in the auction as the dependent variable. Our study extends this line of research by investigating the effect of provider efforts on probability to survive in OLM. Survival has been an area that has received scant attention in OLM context (Banker et al. 2011), yet survival is crucial in uncovering market level mechanisms.

Others have noted the employers' preferences in hiring in OLM (Chan and Wang 2014; Ghani et al. 2014; Hong and Pavlou 2014). Our study does not directly address hiring preferences in OLM, as we are interested in the systematic biases based on country of origin, which affects providers' surviving and thriving in online labor markets. There has been some research on the effects of country of origin in OLM. For example, Gefen and Carmel (2008) provides a look at buyers' preferences towards providers in OLM. They analyze rent-a-coder data with logistic regression. Their findings suggest that there are location effects such that, non-American buyers prefer domestic providers and American buyers have a preference towards off-shore providers. Mill (2011) argues that lack of cues forces buyers in OLM to use indirect cues to infer quality of providers. Mill found that providers from developing countries were less likely to be hired without an established personal reputation. He also demonstrates learning effects in buyer preferences through repeat hires from same countries after a successful transaction. Ghani et al. (2014) in a study of Indian diaspora, found that ethnic Indians were more likely to outsource to India in OLM than non-Indians. The ethnicity effect is just one of many international effects in OLM markets. The geographic biases in provider selection has been comprehensively assessed in Hong and Pavlou (2014). The authors found that language, time zone and cultural differences reduced buyers' utility. Their results also indicate when costs is controlled for, there is a clear preference towards developed country providers, possibly due to negative perceptions of freelancer's work quality from developing countries.

To sum up, the findings from extant prior studies indicate an inconclusiveness on

whether developed or developing country providers have an advantage in OLM. This line of literature has traditionally focused on buyers' choice in granting contracts. We believe, while important, buyer's choice is inadequate to understand mechanisms shaping the market structure. The market structure is determined by who is in the market and how much power they hold (Jacquemin 1972). Survival is an indicator of who remains in the market, wage structure is an indicator of power in the market. By focusing on survival and wage growth we try to understand the driving mechanism behind the market structure. Therefore, our study extends this line of research by investigating the systematic biases garnered by the development level of country of origin in provider survival and wage growth in the OLM context.

3 Hypotheses Development

As we argued earlier, the focus on buyers' choice in prior literature obfuscates viability of a career in OLM. With our focus on the effect of geoeconomics on providers' survival and wage, we are better able to observe the overall effect. In this section, we will seek to propose two sets of hypotheses; (1) those about survival of providers and (2) those related to wage growth patterns. The off-shoring literature has highlighted these two dimensions as key outcomes of off-shore outsourcing (Blinder 2006; Feenstra and Hanson 1999; Grossman and Rossi-Hansberg 2008). Our study revisits the key findings of off-shoring literature in the OLM context with a focus on geoeconomics, shedding some light into a nascent area of inquiry in IS.

3.1 Providers' Survival

While previous research has laid important ground work on the effects of reputation in the global online labor markets (Banker and Hwang 2008; Ghani et al. 2014; Moreno and Terwiesch 2014), much less is known about provider survival (Banker et al. 2011). We theorize the survival of developing country providers despite discrimination in contracting from two perspectives: (1) production cost, (2) perceptions of quality. The production cost argument is grounded in the outsourcing and offshoring literature (Grossman and Rossi-Hansberg 2008). As Roach (2004) highlights, the cost differences between countries will lead to "global labor arbitrage"

as providers from developing countries offer lower prices for the same service. The buyers will procure labor where it is cheaper to increase their returns (Ang and Straub 1998; Blinder 2006; Grossman and Rossi-Hansberg 2008). This in turn leads to the effects observed in the literature that providers from developing countries are more likely to obtain contracts with lower prices.

Providers are able to leverage the global labor arbitrage due to both long term and short term geoeconomic conditions. First, providers from countries with long term living cost advantage will be able to bid lower prices due to lower production costs. Citing an example used by Gefen and Carmel (2008), a $100 bid does not mean the same thing to a provider residing in a developing country, as it does to a provider residing in a developed country. Due to lower cost of living, providers from a developing country can live on a lower income (Aspray et al. 2006; Feenstra and Hanson 1999; Grossman and Rossi-Hansberg 2008). Thus, they are more likely to survive per dollars earned. Hence, despite discrimination noted in contracting that conditional on bid price, providers from developing countries are less likely to obtain contracts (Agrawal et al. 2013b; Hong and Pavlou 2014), the providers from developing countries will still be more likely to survive in OLM.

Hypothesis 1. *Service providers from developing countries are more likely to survive, compared with those from developed countries.*

Second, providers from countries with favorable short term exchange rate fluctuations can leverage this arbitrage effect. Prior research found that depreciation of money often leads to an increase in exports (Auboin and Ruta 2011). It has been noted this phenomenon is even more pronounced in developing country economies, as their currencies are on average 20% undervalued (Freund and Pierola 2008), a consequence of the famous "Balassa-Samuelson"[3] effect (Balassa 1964). As a result of this "Balassa-Samuelson" effect, certain developing countries have been known to use devaluation of currency as a tool to boost exports (Bird 1983). Increase in exports has been attributed to reallocation of resources to export industries, as the resources are moved from production for domestic consumption to the more

[3]The developing country economies will have higher productivity growth, yet the wage growth may end-up being lower. Depending on the exchange rate policy, either the prices (fixed rate) or the exchange rate (floating rate) will appreciate. Leading to exchange rate differentials.

profitable exports (Roberts and Tybout 1997).

We expect the providers in developing countries to move to OLM to provide their services to foreign buyers to reap the same benefits when their currency is weaker. Leveraging arbitrage in this fashion will manifest itself in two dimensions: (1) undercutting dollar prices, (2) obtaining more contracts. Either way, we will see an increase in activity as the providers scramble to leverage the exchange rate effects. As demonstrated in robustness checks of Hong and Pavlou (2014) the developing country contractors bid lower prices providing support for the first dimension. Both effects would indicate that developers from countries with weaker currencies will survive longer for the same amount earned in dollars.

Hypothesis 2. *Providers from countries with weaker currencies are more likely to survive, compared with those from developed countries.*

Hypotheses 1 and 2 are in line with prior literature arguing that, outsourcing leads to a loss in jobs and suppression of wages in developed countries (Aspray et al. 2006; Feenstra and Hanson 1999).

We proceed to discuss how perception of quality of the providers' country of origin based on the development level would affect their survival. The perception of quality argument, feeds from "country of origin effects". It has been found that when customers could not perfectly scrutinize the products' quality, they use country's development level to infer the product's quality (Han 1989). Signaling theory has been used to explain this "country of origin effect" (Verlegh and Steenkamp 1999). The buyers use the country development level as an image-based signal when they have insufficient knowledge of the products' quality, in a sense the image of the country based on development level "spills-over" to the quality of the product. As an example, buyers would perceive products "Made in Singapore" to be of higher quality that products "Made in China". The country-level development-image spill over have not been limited to products, similar effects of reputation transfer have been highlighted in offline (Lin and Chen 2006) and online (Kokkodis 2014) service contexts.

We expect this "country of origin effects" to also manifest in the context of OLM for several reasons. The service quality of a provider is hard to gauge without

actual dyadic experience (Nelson 1970). In the absence of a reliable signal, the buyers will utilize country image to infer quality of service providers. Therefore, the providers from developed countries are viewed as higher quality due to better country-level infrastructure (Agrawal et al. 2013b). This contracting behavior is especially salient when the provider lacks any individual reputation and the buyers use country reputation to infer quality (Hong and Pavlou 2014; Mill 2011). As providers start building up reputation, the role of "country of origin" will fade away. Thus we propose that, country reputation will have an effect on provider survival.

Hypothesis 3. *The effect of individual reputation on survival is higher for providers from developing countries, compared to developed countries.*

3.2 Wage Growth

The effect of OLM on wage growth in labor markets is two fold: (1) average wage differential (difference in wages reflecting the utility of the job to the worker (Brown 1980; Rosen 1987)); and (2) wage growth (change in wages over time). The wage growth is important as it measures the wage suppression argument often raised in off-shoring literature (Blinder 2006).

Based on our discussion of Hypotheses 1 and 2. The production cost advantages in developing countries will lead the providers from developed countries to be crowded out of the labor markets (Blinder 2006; DuMond et al. 1999; Grossman and Rossi-Hansberg 2008) at higher skill/cost segments. Our data shows evidence of this trend as presented in Appendix 5.3. Previous research has identified the transaction costs due to language and culture barriers (Ghani et al. 2014; Hong and Pavlou 2014). Hence, there will still be room in the low cost segment for developed country providers as the lower paying, lower skill jobs in OLM will not be as accessible to lower skill laborers of developing countries due to infrastructure/language barriers increasing transaction costs (Hong and Pavlou 2014; Prieger et al. 2003). When these transaction costs are sufficiently high to off-set gains in production costs, the buyers will opt for developed country alternatives (Ang and Straub 1998). Thus, the more skilled of the developed country providers will move out of OLM, leaving the jobs with higher premiums to their counterparts in developing countries. The

lower tier of developed country providers, protected by language/culture barriers will remain. This phenomena will lead to developing countries taking on higher paid jobs.

Hypothesis 4. *On average, service providers from developing countries will have higher earnings, compared to providers from developed countries.*

After establishing the effect of country level development on earnings, we seek to propose the effect of country level development on earning growth rate. Earning growth rate is related to market dynamics. In the early stages of the market development, the marketplace reputation system is not effective because very few service providers are rated. Therefore, unable to signal their individual quality, service providers from developing countries would compete on pricing, and service providers from developed countries have a competitive edge because they are perceived to have a higher quality (Hong and Pavlou 2014), hence they would command a premium. As the marketplace matures, high skill service providers from developing countries are able to signal their quality and command higher prices, whereas those low skill service providers from develped countries would receive an undercut from their earnings because their country-level reputation may not help them in the presense of individual reputation. Therefore,increased competition from high skill service providers who are able to signal their quality through reputation systems, will dampen the ability of service providers from developed countries to receive a price premium, thereby putting downward pressure on their earnings (Blinder 2006) and reducing their potential for earning growth over time. Based on the above discussion, we propose:

Hypothesis 5. *On average, service providers from developing countries have a higher earnings growth rate.*

4 Empirical Methodology

4.1 Data

The data for this study are obtained from three archival sources. First, we used proprietary transaction data from a leading online labor marketplace for the period

between January 2006 and October 2010. This online labor market is the largest online outsourcing and crowdsourcing labor markets with providers from 247 countries. For this study, we are focusing on providers on this platform who have logged in at least twice and have placed at least one bid after registering at the website. After including those users who we can match with the variables of interest, we ended up with 475,503 observations of 40,874 providers.

In online labor markets, buyers post projects for the providers to bid. The project provides the task description, specifications, and skills necessary to complete the job before deadline. Such markets largely follow a reverse, buyer-determined auction mechanism (Hong et al. 2015), in which the buyer will select a provider to maximize his expected utility. In online labor markets, the moral hazard and adverse selection are risks any OLM needs to address (Moreno and Terwiesch 2014). The freelancer provides a reputation system where the buyers can rate and comment on the service provided, as well as an arbitration system to resolve any disputes. When a contract is granted, the buyer places the money in escrow until the buyer reports completion of the project.

Second, we obtained economic indicators for countries from the World Bank database and matched the data onto the transaction data. Finally, we obtained the currency units per SDR from International Monetary Fund (IMF) to construct the exchange rates measures.

Therefore, our dataset includes both provider level and country level variables. We describe the measures of our dependent variables and independent variables below. We also observe provider's registration date, billing address and any time they log into the website (login time and login ip addresses). Based on the registration date and login activities, we will construct a measure for market exit, which we detail below. We define the measures of our key variables in Table 1, and report the descriptive statistics and correlation matrix in Table 2.

Exit: The provider's exit from the market is defined as no login activity in the 3 month period before our last observation date. It is operationalized as a binary variable (1 = exit; 0 = no exit). We repeated all our analyses using a 6 month window as well and all the results remain qualitatively similar in terms of signs, the

Variable	Description
Exit	Binary indicator for the month of exit from the market, set to 1 for month of exit.
Developed	Binary development measure.
Provider Reputation	Ratio of successfully completed projects to all projects attempted thus far by the provider.
Won Projects	Rolling average of projects won in the last three months for individual provider.
Completed Projects	Rolling average of projects completed by the provider in the last three months.
Earning	Rolling average of the provider's earnings in the last three months in dollars.
XRate	Average exchange rate for a country in a month.

Table 1. Variables

significance levels and effect sizes.

Developed: Country income level based on GNI per capita above or below $12,736 as per World Bank guidelines (World Bank 2015). Low and middle income level countries are often called developing countries. We also used GDP_PPP as a robustness check. GDP_PPP refers to the purchasing power parity adjusted GDP per capita of the provider's country of residence (See Appendix 5.3). GDP_PPP is an economic measure for the relative value of per capita income after adjusting for the purchasing power of the country's currency. This concept has been widely considered in the IS (Gefen and Carmel 2008; Hong et al. 2015) and economics literature (Lee and Tang 2000; Lothian and Taylor 1996). To obtain data on GDP_PPP and GNI per capita, we first need a reliable source of data on the provider's country of residence. We observe the providers' country of residence based on the log-in IP addresses that reveal the country information when providers register for the marketplace. We also verified this data with the self-reported billing addresses of the providers on this marketplace. 31% of our observations were from developed countries.

Provider Reputation is measured by the ratio of successfully completed projects to all projects contracted (completion rate) between the provider and any outsourcing firm. Completion rate is an objective measure of both the provider's reputation and quality. We also used average rating of the developer in any given month as a measure of reputation, the results are consistent with success rate (See Appendix 5.3).

	μ	σ	1	2	3	4	5	6
Developed	0.41	0.49						
Exit	0.05	0.22	0.01***					
Provider Reputation	0.34	0.38	-0.02***	-0.09***				
Won Projects	0.48	1.92	-0.10***	-0.04***	0.12***			
Completed Projects	0.25	1.34	-0.08***	-0.04***	0.15***	0.94***		
Earning	68.03	424.48	-0.07***	-0.03***	0.12***	0.48***	0.46***	
XRate	0.28	0.33	0.90***	0.01***	-0.01***	-0.09***	-0.08***	-0.07***

Table 2. Descriptive Statistics and Correlation Matrix

For the wage growth analysis we aggregated data presented above at country level for 152 countries in a monthly basis. For growth analysis, we only used development level and monthly earnings over time.

4.2 Survival Analysis

Survival analysis estimates the probability of a subject experiencing the event (exit market) conditional on the independent variables, given that subject survived so far. The advantage of Cox Proportional Hazards (CoxPH) over the logistic regression model is that it takes into account information on the duration to exit and improves the estimation accuracy. The approach we used in this study allows for time variant covariates. Hence, we aggregated data into monthly periods and estimated service providers' market exit probability at the end of each period.

Considering the binary outcome variable, logistic regression model can serve as a good baseline model. One shortcoming of a logistic analysis is that it does not take into account the duration of active period when the providers have not exited the market, and it does not take care of right censoring. The survival models provide natural remedies for such shortcomings. Nevertheless, we ran logistic regression analysis as preliminary analysis and the results are consistent with survival model results (Appendix 5.3). For the survival analysis, we used the Cox proportional hazards model for estimation (Cox 1972). Compared with other survival models, CoxPH stands out as having fewer assumptions on the underlying survival distribution, and being robust under a wider variety of conditions.

We used a Cox Proportional Hazards model with time-variant covariates. This model is an extension of regular Cox Proportional Hazards model (Cox 1972) as

discussed in Thomas and Reyes (2014). The model predicts probability of survival given the covariates. X are covariates observed over time. x*(t) is a known function specifying values of X over time.

$$\hat{S}(t|X(t)) = exp\left[\sum_{i=1}^{n}\int_{0}^{t}\frac{exp\{\hat{\beta}x^{*}(u)\}dN_i(u)}{\sum_j Y_j(u)exp\{\hat{\beta}X_j(u)\}}\right] \quad (1)$$

In such survival models, we tackle with two issues to achieve proper econometric identification. First, right censoring is expected because there may be observations in the dataset that have not yet dropped out at the end of the observational window. We used a three month before the end of observation as the censoring variable to address this issue. Figure 1 provides a graphical illustration of the survival data with observations of ten selected providers for three month censoring window. Providers whose last login dates were before the September 22^{nd}2010 (more than 3 month being inactive) are depicted in solid shaded bars, and are defined to have dropped out of this labor market. Providers that have login activities after the cut-off mark are depicted in striped bars are assumed to be active. We analyzed the data using different cut-off points (e.g., 6 months before the last observational date), and the results are consistent with the 3 months cut-off in terms of sign and significance level of the parameter estimates (Appendix 5.3). Therefore, we safely conclude that the results are not sensitive to the cut-off points.

Second, providers enter the marketplace at different points of time, creating additional heterogeneity. It is likely that providers who enter the market early survive longer because of less intensive competition. The discrete time slots used in the time variant survival model takes into account providers' entry timing.

Table 3 reports the maximum likelihood coefficient estimates and hazard ratio estimates of the survival analysis using a Cox proportional hazards model in *R* (Therneau 2014). We added the variables of interest into the models in the order we present our hypotheses. We started with a model with just the control variables derived from the literature on OLM. Then integrated country development level to verify hypothesis 1. We proceeded to adding exchange rate in the third model, and finally added the hypothesized interactions. Likelihood ratio tests indicate that each model is a significant improvement over the previous model. Since the

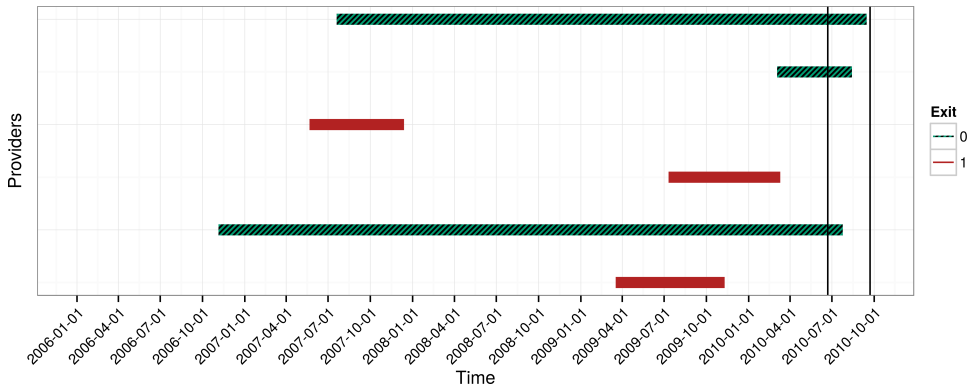


Figure 1. Illustration of Survival Data with Life Lines for six month cut-off

	Model 1	Model 2	Model 3	Model 4
Reputation	$-0.937\ (0.021)^{***}$	$-0.940\ (0.021)^{***}$	$-0.939\ (0.021)^{***}$	$-1.197\ (0.030)^{***}$
Won Projects	$0.304\ (0.009)^{***}$	$0.307\ (0.009)^{***}$	$0.307\ (0.009)^{***}$	$0.307\ (0.009)^{***}$
Completed Projects	$-2.873\ (0.081)^{***}$	$-2.863\ (0.081)^{***}$	$-2.864\ (0.081)^{***}$	$-2.819\ (0.081)^{***}$
Earning	$-0.001\ (0.000)^{***}$	$-0.001\ (0.000)^{***}$	$-0.001\ (0.000)^{***}$	$-0.002\ (0.000)^{***}$
Developed		$0.105\ (0.013)^{***}$	$0.136\ (0.030)^{***}$	$0.029\ (0.031)$
XRate			$-0.051\ (0.045)$	$-0.068\ (0.045)$
Rep x Developed				$0.525\ (0.041)^{***}$
Earning x XRate				$0.002\ (0.000)^{***}$
AIC	440763.213	440700.623	440701.350	440470.732
R^2	0.018	0.018	0.018	0.018
Max. R^2	0.611	0.611	0.611	0.611

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Table 3. Time-variant survival model results.

results are qualitatively the same across the models, we are presenting estimation results of the full model with all independent variables, interaction effects and the control variables. Please refer to Equation 2 for the estimation equation. The model estimates the probability of a provider i to drop out at time t given that he has not yet dropped out.

$$h(t|z) = h_0(t)e^{\beta' X_i t + \alpha_t + \epsilon_{it}} \tag{2}$$

$X_{it} = Reputation_{it}, WonProjects_{it}, CompletedProjects_{it}, Earning_{it}, Developed_{it}, ExchangeRate_{it}$

Notably, the results of the econometric analysis provide support for our hypotheses. First, the country's development level has an effect such that the developing country providers survive longer, and the developed country providers survive

shorter as seen in Model 3. This effect is fully mediated by individual reputation (Model 4). Thus lending support to our hypotheses 1 and 3. Second, we found that the effect of earnings were moderated by the exchange rate, such that providers from countries with less valuable currencies were more likely to survive whereas those from countries with more valuable currencies were less likely to survive for the same amount of earnings, supporting our hypotheses 2.

It is usually easier to achieve statistical significance in large sample analyses such as ours. Therefore, based on the suggestions from the recent IS literature (Lin et al. 2013), we also assess the economic significance of the key determinants using their estimated effect sizes. As a standard practice (Angrist and Pischke 2008; Wooldridge 2010), we use estimated marginal effects (marginal hazard ratios) for interpretation. We visualize both the marginal main effects and interaction effects in Figure 2 and Figure 3, respectively.

First, to visualize the marginal effects, we plotted the hazard rate for development level in Figure 2. We used Model 3 to plot the main effects. The providers from developed countries were 12% more likely to drop out than others (Figure 2).

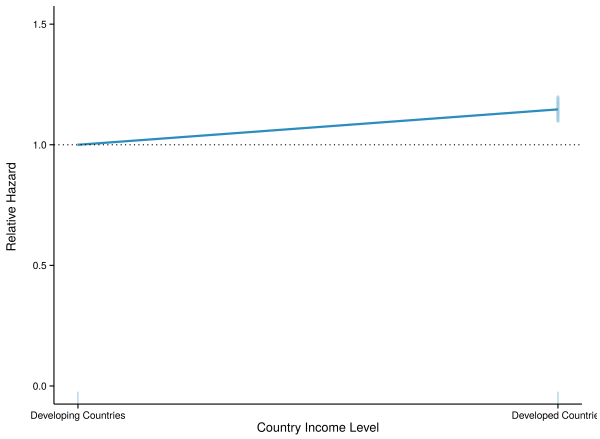
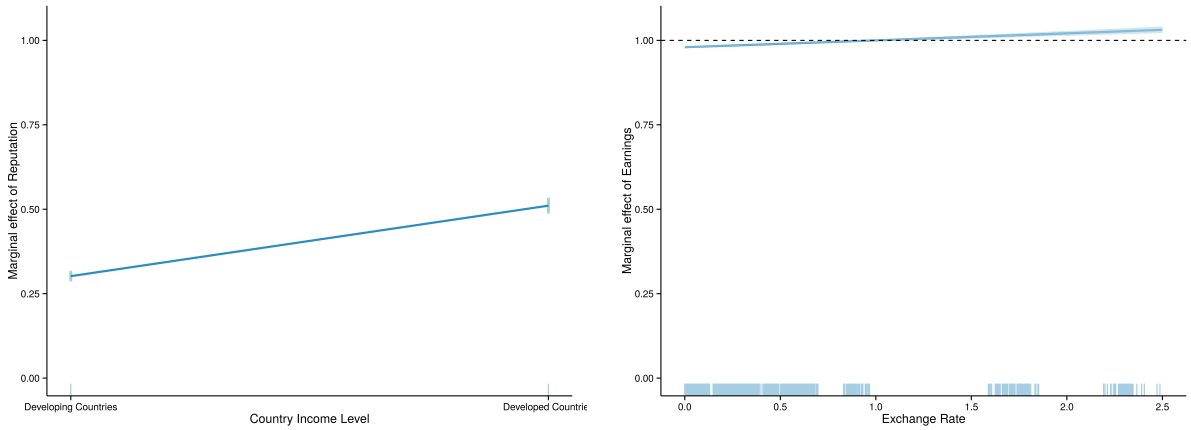


Figure 2. Country Development

Second, we plotted the marginal effects of hypothesized interaction effects in Figure 3. Plots of reputation and development level can be seen in Figure 3a. In the graph, the mid blue line is the average marginal effect of provider reputation given development level, and we see the outer ribbon at discrete values of development level which indicates the 95% confidence interval of the mean estimates. For this plot we used Model 4. We see that the marginal effect of reputation from developed

countries is .51 whereas it is only .30 in developing countries. Which constitutes a significant difference.

Finally, we investigated the marginal effects of earnings, exchange rate interaction Figure 3b. Again, the average marginal effect, is surrounded by the confidence interval. We see that each 10 dollars earned reduces the exit likelihood by about 2% in countries with less valuable currencies (exchange rate=0.01), whereas it increases the exit likelihood by 2% in countries with very valuable currencies (2.4). At mean, the marginal effect is close to .985.



(a) **Interaction of Reputation and Development** (b) **Interaction of Earnings and Exchange Rate**

Figure 3. Interaction Effects in the Survival Model

4.3 Wage Growth Analysis

Since we were interested in uncovering patterns in wage growth over time in developed and developing countries, we fitted a growth model. Following Bliese and Ployhart (2002), we carry out a random coefficients growth model similar to multilevel regression models. The key advantage of growth modeling over more traditional panel data approaches is that it allows time to have chronological ordering while at the same time accounting for clustering effects.

We aggregated our monthly data at the country level for the analysis below. To ensure correct specification, we followed guidelines of Bliese and Ployhart (2002). First we fit a baseline model at level 1 with no random effects, and increased complexity by (1) adding more time fixed effects (linear, quadratic, cubic...), (2) adding random intercept, (3) adding time random slopes, (4) accounting for auto correla-

tion and heteroscedasticity in variance over time, and finally (5) modelling intercept and slope variability at country level. After each step we make sure the model is improved through likelihood ratio tests.

Equation 3 shows the multi level random coefficients growth model used in this study. The first level is time, second level is country. The estimated model can be seen in Equation 4. We allowed for the countries to have random intercepts and random slopes in time. We used autoregressive (AR1) correlation structure to account for time level interdependencies.

$$\begin{aligned} Y_{ij} &= \pi_{0j} + \pi_{1j} \times Time_{ij} + \pi_{2j} \times Time_{ij}^2 + r_{ij} \\ \pi_{0j} &= \beta_{00} + \beta_{01} \times Developed_j + u_{0j} \\ \pi_{1j} &= \beta_{10} + \beta_{11} \times Developed_j + u_{1j} \\ \pi_{2j} &= \beta_{20} + \beta_{21} \times Developed_j + u_{2j} \end{aligned} \tag{3}$$

$$\begin{aligned} Y_{ij} = \beta_{00} + \beta_{01} \times Developed_j + \beta_{10} \times Time_{ij} + \beta_{11} \times Developed_j \times Time_{ij} \\ + \beta_{20} \times Time_{ij}^2 + \beta_{21} \times Developed_j \times Time_{ij}^2 + u_{0j} + u_{1j} \times Time_{ij} + \\ u_{2j} \times Time_{ij}^2 + r_{ij} \end{aligned} \tag{4}$$

Table 4 shows the growth model results. Model 1 represents the baseline model, Model 2 adds the random intercepts, Model 3 adds random coefficients for time, Model 4 adds the AR1 autoregressive correlation structure, and finally Model 5 adds the Level 2 intercept and slope variability for developed and developing countries (This is the model in Equation 4).

Figure 4 shows the wage trajectories for developed and developing countries over the 57 month period between 2006 and 2010 in our data. To obtain these plots, we randomly sampled separately 5000 developed countries (100 per month) and 5000 developing countries from the data. The income level and time were fixed, we combined these with the country data and plotted the results. With a bootstrapping approach, the large simulation size makes sure the overall trend observed in this figure is robust. As can be seen, the developing countries are on average earning

	Baseline	Random Int.	Random Coef.	AR1	Level 2
Intercept	2.0138 (0.0679)***	1.5954 (0.1222)***	1.6252 (0.1394)***	1.6420 (0.1428)***	1.4153 (0.1635)***
time	0.0198 (0.0059)***	0.0362 (0.0043)***	0.0359 (0.0049)***	0.0343 (0.0060)***	0.0442 (0.0074)***
time ^{2}	−0.0002 (0.0001)	−0.0004 (0.0001)***	−0.0004 (0.0001)***	−0.0004 (0.0001)***	−0.0005 (0.0001)***
Developed					0.7274 (0.2612)**
time × Developed					−0.0324 (0.0129)*
time ^{2}× Developed					0.0005 (0.0002)*
AIC	28910.1184	24925.8382	24465.4455	23942.6316	23939.8839
BIC	28937.5434	24960.1194	24513.4391	24004.3377	24022.1587
Log Likelihood	−14451.0592	−12457.9191	−12225.7227	−11962.3158	−11957.9419
Num. obs.	7018	7018	7018	7018	7018
Num. groups		152	152	152	152

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Table 4. Wage Growth Models

more (Hypothesis 4) and enjoying higher wage growth (Hypothesis 5). This is evidence that the OLM wage growth in developed countries is being pressured by international competition, especially when the market matures.

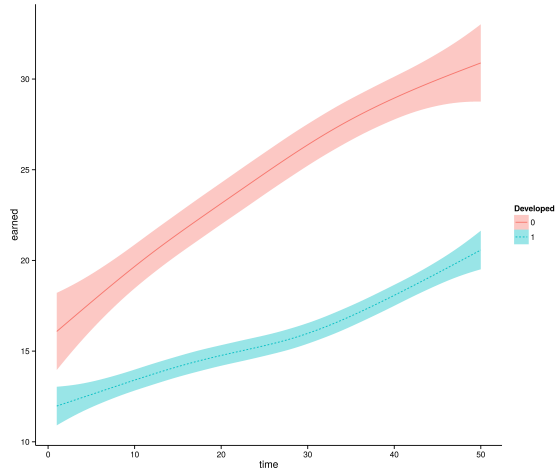


Figure 4. Wage growth in Developed and Developing Countries

5 Discussion

In this study we tried to observe the effect of country of origin in shaping the OLM market structure. We investigated two major dimensions identified by outsourcing literature: (1) Job Loss, and (2) Wage Pressure, through survival and wage growth analysis. To our knowledge, our paper is one of the first studies to investigate geoeconomic dynamics of labor competition in these platforms from a survival and

wage growth stand point. Survival and wage growth of providers in this context provides useful insights as to the make up of labor markets is highly dependent on this. Furthermore, we present a unique perspective on trends in OLM earnings in developed and developing countries.

Hypotheses	**Status**
H1 The developing country providers will be more likely to survive.	✓
H2 Providers from countries with weaker currencies will be more likely to survive.	✓
H3 Effect of reputation on survival is higher for providers from developing countries.	✓
H4 Developing countries will earn more	✓
H5 Developing countries will see higher growth in earnings	✓

Table 5. Status of Hypotheses Testing

Leveraging a unique data set combining a proprietary database from a global online labor market and data from the World Bank, and International Monetary Fund we identified several key determinants of provider's survival. We investigated development level and country reputation, and demonstrated significant effects of each (See Table 5). Notably, we found that country development had an effect on provider survival. The providers from developing countries where they had a comparative cost advantage were more likely to survive. We also found that there were spillover reputation effects between the providers from the same country. The survival of one depends on the reputation of her countrymen. Our results also revealed that providers from developing countries benefited more from a better individual reputation. We believe this is due to the initial perception about developing countries low quality. Once a provider overcomes this perception through reputation, he/she benefits more (Agrawal et al. 2013b).

On the wage suppression side, we found that there were systematic differences between developed and developing country providers. The developing country providers not only earned more, their earnings grow at a faster pace compared to their developed country providers. This finding seemingly contradicts the generally accepted wisdom, that the developing country providers work for a pittance. We believe this effect can be explained by developing country providers dominating high skill segments of OLM.

5.1 Implications

This paper provides unique implications for both theory and practice. In terms of theoretical implications, this study advances multiple streams of literature. First, this work relates to outsourcing literature(Aspray et al. 2006; Blinder 2006; Bottini et al. 2007; Feenstra and Hanson 1999) by tracing the effects of country development on provider survival and wage growth in OLM. Our contribution is to find evidence of job loss and downwards wage pressure. Our results hint at developing country providers taking over certain segments of the OLM and driving out the developed country providers.

Second, this study builds on, and furthers the understandings of firm and vendor survival in online markets. It has been shown that reputation (Banker et al. 2011), organizational capabilities (Wang et al. 2011) are important in online sellers' survival and success; and the differing effect of internationalization on firm survival and growth (Sapienza et al. 2006). This study contributes to the literature by looking at the interplay between development level and provider reputation. We found that reputational benefit is more salient for providers from developing countries.

Third, this study also relates to the emerging IS literature on OLM. While most of the current studies of OLM focus on the outsourcing firms' choices (Banker and Hwang 2008; Malone and Laubacher 1999; Moreno and Terwiesch 2014; Scholz and Haas 2011; Tambe and Hitt 2010; Yoganarasimhan 2013) to look at the factors that determine which provider gets a contract, we focus on higher level issues of provider drop out and wage growth. Utilizing a proprietary dataset we were able to identify the key determinants of the provider's survival in online labor markets. Our look into the wage growth patterns is also a unique contribution to this line of research.

Fourth, our findings support and extend the literature that challenges the well-known flat world phenomena (Gefen and Carmel 2008; Gerth and Rothman 2007; Hong and Pavlou 2014). Mithas and Whitaker (2007) and Tambe and Hitt (2012) have shown that not all jobs were impacted the same way by this flat world phenomena. Beyond the job requirements, the previous literature has identified language, cultural similarities and distance as factors that influenced international competition beyond the cost advantages (Han 1989; Hong and Pavlou 2014; Mill 2011). We

extended this literature with the introduction of country development. Our results indicate that the outsourcing firms consider the development level of the providers' country of origin in hiring decisions. Furthermore, our wage growth analysis indicates, instead of a convergence of wages as one would expect under the flat world phenomenon, the developing countries are increasing their earnings beyond those commanded by developed country providers.

Finally, this study also contributes to online reputation and reputation transfer in the IS literature. Previous studies on reputation in online markets have mainly focused on individual's, individual firm's or individual provider's reputation in a marketplace, such as Amazon (Mudambi and Schuff 2010) , eBay (Dimoka et al. 2012), online labor markets (Banker and Hwang 2008; Yoganarasimhan 2013), etc. Emerging literature begins to study transference of reputation for a single provider over multiple job categories (Kokkodis 2014). Han (1989) has found that the country reputation was implicit in evaluations of products. We extended the literature on online reputation by bringing in country effects into the equation. Our investigation revealed that the country reputation, can be transfered between providers of the same country and has an effect above and beyond individual provider's reputation. Following on the same line of inquiry we found the moderating role of individual reputation on the effect of country of origin's development level. Our results indicated providers from developing countries benefited more from a better individual-level reputation.

The practical implications of our study will be of interest to different stakeholders of online labor markets: platform owners, buyers, and providers. First, we observe that it is harder to compete for providers from developed countries. Providers from developing countries can use the online labor market places to make a living. Inexperienced providers from the developed countries have a slight advantage over similar providers in the developing world, as they are perceived to be higher quality. Our findings on country level reputations indicate that buyers care about providers' location. The platform owners can make this information more prominent in displaying the bids. While not completely ethical, this also means providers can use false flags to increase their chances of survival. All these country of origin effects

don't mean providers are powerless. Providers can improve their chances of survival by having good reputation and completing projects.

5.2 Limitations and Suggestions for Future Research

This study has several limitations, which opens up opportunities for future research.

First, our results indicate that the providers from richer countries are at a serious disadvantage in both survival and wage growth, yet we still see a significant number of active providers from these countries (Appendix 5.3). Our results do not fully explain how providers from rich countries compete. We believe there may be project types and specialized niches where providers from developed countries may still have an advantage. Yet, this question is out of the scope of this study and we leave it for further research.

Second, while we investigate some measures of country of origin, there are other dimensions such as language, culture, time zones, which are beyond the scope of our geoeconomic perspective. To provide a more comprehensive picture of international competition in online labor markets, we believe further study with an extended set of variables is warranted.

Third, we used survival and wage growth as measures of provider success. While these are sound methods with a long history, recent advances have made it possible to predict provider behavior beyond survival using methods such as generalized Pareto/NBD Model (Fader et al. 2005) . These new empirical methods can allow us to investigate the life time productivity of providers as well as their eventual drop out simultaneously.

5.3 Concluding Remark

Information technology, in particular the platform technologies and related business models (Eisenmann et al. 2006; Parker and Van Alstyne 2005), has lead to a shift towards higher reliance on markets rather than hierarchies to coordinate economic activities (Malone et al. 1987). As Malone and Laubacher (1999) has correctly predicted over a decade ago, the "e-lance" economy is taking off in recent years and millions of providers are joining and competing on global online labor markets. A

successful and healthy labor market relies on the survival and success of market participants, in particular a healthy supply of high quality labor. Given the high provider drop out rate, the underlining mechanisms for provider drop out remain illusive and intriguing. Leveraging a unique data set composed of proprietary data from a global online labor market and the World Bank, we provide a pioneering effort in identifying the key determinants of providers' survival and earnings. Our study calls for a deeper understanding of online labor in a platform economy, and how providers in different countries could build their competitive advantage to survive and thrive.

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Appendices

Active Service Providers over Time

Figure 5 shows the number of active service providers across developed and developing countries. We calculated the number of active providers by subtracting the cumulative number of exits by the cumulative number of entries of the 40,874 providers we observed. The pattern observed supports our crowding out argument.

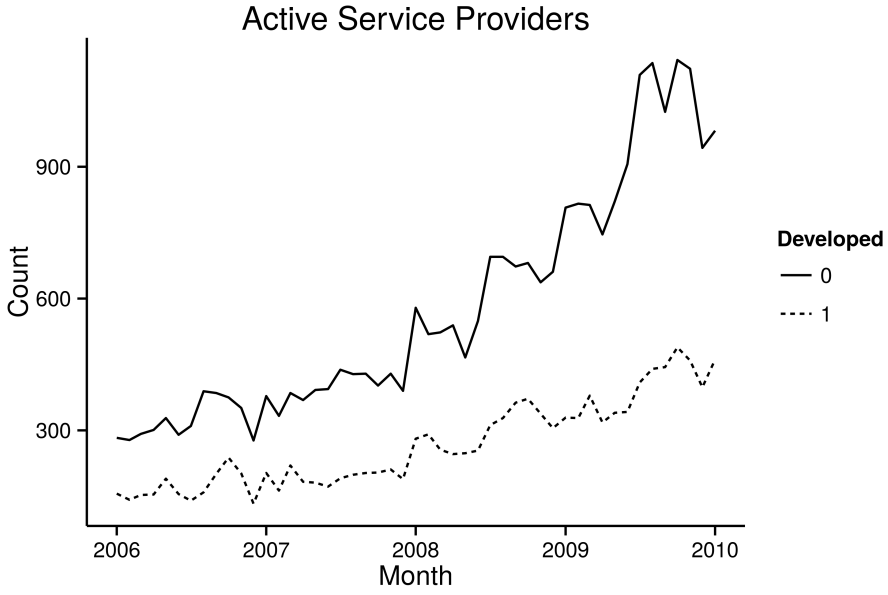

Figure 5. Number of Active Providers Across Developed and Developing Countries

We have also calculated per project income for providers in our data set. Developing country providers earned $388.15 per project, yet the developed country providers only made $275.50 per project.

Logit Regression Models

Table 6 shows the coefficient estimates for the logit model. The signs and coefficient estimates of hypothesized relations are qualitatively consistent across the models. Considering the two models use different abstractions of data (cross-sectional in logit, panel in time variant survival) the other differences are to be expected.

	Model 1
(Intercept)	$1.025\ (0.263)^{***}$
Reputation	$-1.750\ (0.044)^{***}$
Developed	$0.348\ (0.063)^{***}$
Won Projects	$-0.067\ (0.021)^{**}$
Completed Projects	$-0.396\ (0.065)^{***}$
Earning	$-0.002\ (0.000)^{***}$
XRate	$-0.114\ (0.089)$
Reputation x Developed	$0.655\ (0.064)^{***}$
Earning x XRate	$0.002\ (0.000)^{***}$
Registration Date Fixed Effects	YES
AIC	43221.195
BIC	43970.982
Log Likelihood	−21523.597
Deviance	43047.195
Num. obs.	40874

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Table 6. Logistic Regression Results on Developer Exit

Robustness Check: Six Month Cut-Off for Exit

You see survival models with different cut-off points in Table 7. The results are consistent irrespective of the cut-off value used.

	3 Month cut-off	6 Month cut-off
Reputation	$-1.197\ (0.030)^{***}$	$-1.263\ (0.035)^{***}$
Developed	$0.029\ (0.031)$	$-0.013\ (0.035)$
Won Prj	$0.307\ (0.009)^{***}$	$0.312\ (0.009)^{***}$
CompPrj	$-2.819\ (0.081)^{***}$	$-2.726\ (0.089)^{***}$
Earning	$-0.002\ (0.000)^{***}$	$-0.002\ (0.000)^{***}$
XRate	$-0.068\ (0.045)$	$-0.039\ (0.051)$
Reputation x Developed	$0.525\ (0.041)^{***}$	$0.571\ (0.047)^{***}$
Earning x XRate	$0.002\ (0.000)^{***}$	$0.002\ (0.000)^{***}$
AIC	440470.732	342511.834
R^2	0.018	0.014
Max. R^2	0.611	0.520
Num. events	24221	18959
Num. obs.	475503	475503

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Table 7. Survival Model Robustness Check on 6 Month Cut-off.

Robustness Check: Continuous GDP Specification

We used ppp adjusted GDP as a continuous indicator of the countries development level instead of the binary indicator variable. Results remain consistent as seen in Table 8.

	Model 3	Model 3 Continuous GDP
Developed	0.029 (0.031)	
log(GDPppp)		−0.005 (0.012)
Reputation x Developed	0.525 (0.041)***	
Reputation x log(GDPppp)		0.279 (0.019)***
Reputation	−1.197 (0.030)***	−3.639 (0.187)***
Projects Won	0.307 (0.009)***	0.307 (0.009)***
Projects Completed	−2.819 (0.081)***	−2.806 (0.081)***
Earning	−0.002 (0.000)***	−0.002 (0.000)***
XRate	−0.068 (0.045)	−0.027 (0.039)
Earning x XRate	0.002 (0.000)***	0.002 (0.000)***
AIC	440470.732	440426.761
R^2	0.018	0.018
Max. R^2	0.611	0.611

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Table 8. Survival Model Robustness Check on Continuous GDP.

Robustness Check: Using Rating instead of Success Rate

We anticipate some criticism on our choice of using success rate as a measure of reputation. We choose the success rating as there was a lot of missingness in rating variable (not every successful project is rated) and there are well known biases towards extremes in ratings. Hence we opted to use success rate in our study. The rating varies between 0 and 10 and success rate varies between 0 and 1. As can be seen in Table 9, the results are qualitatively the same no matter the actual measure.

	Model 3	Model 3 Ratings
Reputation (Success Rate)	$-1.197\ (0.030)^{***}$	
Reputation (Rating)		$-0.105\ (0.002)^{***}$
Reputation (SR)x Developed	$0.525\ (0.041)^{***}$	
Reputation (R) x Developed		$0.025\ (0.003)^{***}$
Developed	$0.029\ (0.031)$	$0.090\ (0.032)^{**}$
Won Projects	$0.307\ (0.009)^{***}$	$0.348\ (0.009)^{***}$
Completed Projects	$-2.819\ (0.081)^{***}$	$-2.867\ (0.081)^{***}$
Earning	$-0.002\ (0.000)^{***}$	$-0.002\ (0.000)^{***}$
XRate	$-0.068\ (0.045)$	$-0.071\ (0.045)$
Earning x XRate	$0.002\ (0.000)^{***}$	$0.002\ (0.000)^{***}$
AIC	440470.732	438434.898
R^2	0.018	0.023
Max. R^2	0.611	0.611

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Table 9. Survival Model Robustness Check on Ratings for Reputation.

Robustness Check: Country Reputation

We use development level to infer quality perceptions spilling over due to country of origin. It is natural to expect this to be confounded by the performance of the other developers from the same country. We control for the country reputation by aggregating success rate by country. Our results demonstrate that development has an effect above and beyond performance of country as a whole as seen in Table 10.

	Model 3	Model 3 Country Reputation
Reputation	-1.197 $(0.030)^{***}$	-1.546 $(0.104)^{***}$
Developed	0.029 (0.031)	0.013 (0.032)
Won Prj	0.307 $(0.009)^{***}$	0.306 $(0.009)^{***}$
Completed Prj	-2.819 $(0.081)^{***}$	-2.814 $(0.081)^{***}$
Earning	-0.002 $(0.000)^{***}$	-0.002 $(0.000)^{***}$
XRate	-0.068 (0.045)	-0.043 (0.046)
Reputation:Developed	0.525 $(0.041)^{***}$	0.528 $(0.041)^{***}$
Earning x XRate	0.002 $(0.000)^{***}$	0.002 $(0.000)^{***}$
Country Rep		-0.806 $(0.136)^{***}$
Country Rep x Rep		0.990 $(0.268)^{***}$
AIC	440470.732	440438.694
R^2	0.018	0.018
Max. R^2	0.611	0.611

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Table 10. Survival Model Robustness Check on Country Reputation.