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# The Internet and Product-Level Entry into the U.S. Market

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U.S. International Trade Commission

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# The Internet and Product-Level Entry into the U.S. Market

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May 14, 2015

## Abstract

We estimate an econometric model of product-level entry of middle income countries into the U.S. market. The model uses data on U.S. imports of 1,159 technologically advanced manufactured goods from 87 middle income countries between 2001 and 2013. The econometric estimates indicate that Internet use in the middle income countries has a significant positive effect on the probability of product-level entry into the export market, as do real exchange rate depreciations and growth in real expenditures and output. According to the model, the probability of product-level entry increases by 1.18 percentage points for every 10 additional Internet users per 100 people in the countries that have highly efficient export logistics, and by 0.65 percentage points in the countries that have less efficient export logistics. We use this econometric model to simulate the increase in each country's product-level entry if the country's number of Internet users increased to 75 users per 100 people (a value above all of the middle income countries but below most high income countries in 2013). The simulated increases in the probabilities range from 0.28 percentage points for Hungary to 7.07 percentage points for India, with an average across all of the middle income countries of 3.12 percentage points.

**Keywords:** Exporting, Internet Use, Entry Decisions, Developing Countries

**JEL Classifications:** F14, F15, O33

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## 1. Introduction

It is often the case that middle income countries have the capacity to produce technologically advanced manufactured goods at internationally competitive costs but still do not successfully export the goods to the United States and other high income countries. Zero export values, year after year, suggest that there are significant scale requirements and other obstacles to entering the U.S. market, including information barriers. Improved communications through the Internet, working together with other trade facilitation measures, can reduce trade costs and can improve the likelihood of export success.

In this paper, we use a statistical analysis of product-level trade flows to explore these possibilities. We investigate whether an increase in the number of Internet users in a middle income country significantly increases the probability that the country will start exporting manufactured goods that it had not previously exported. This approach is complementary to case study approaches. While analyses of specific cases are essential for understanding *how* the Internet facilitates exporting, our statistical approach has the advantage that it can provide more comprehensive estimates of *how much* the Internet facilitates exporting overall.

We estimate an econometric model of the product-level entry of middle income countries into the U.S. market. The model uses data on U.S. imports of 1,159 technologically advanced manufactured goods from 87 middle income countries between 2001 and 2013. It links decisions to enter the U.S. market to the economic characteristics of the middle income countries, including measures of the countries' Internet use, the efficiency of their export logistics, the growth of real GDP in the United States and in the potential entrants, and real exchange rate fluctuations.

Overall, the econometric estimates indicate that Internet use in the middle income countries has a significant positive effect on the probability of product-level entry into the United States. The effects of Internet use are larger for countries with highly efficient export logistics.[2] According to the model, the probability of product-level entry increases by 1.18 percentage points for every 10 additional Internet users per 100 people in the countries that have highly efficient export logistics, and by 0.65 percentage points in the countries that have less efficient export logistics.

[2] Export logistics refers to the amount of time required for document preparation, customs, inland transport, and port handling before exporting from the country, as we discuss in Section 2.

Then we use the econometric model to simulate the increase in each country's product-level entry if the country's number of Internet users increased from current levels to 75 users per 100 people. This is above the number in all of the middle income countries in 2013 but below the number in most high income countries in that year. The increases in the probabilities of product-level entry into the U.S. market vary across the middle income countries, depending on the country's number of Internet users in 2013 and the efficiency of the country's export logistics. The simulated increases in the probabilities range from 0.28 percentage points for Hungary to 7.07 percentage points for India, with an average across all of the middle income countries of 3.12 percentage points.[3]

This paper contributes to several lines of research into the economics of international trade. The most relevant are studies of the effects of the Internet on the trade of developing countries. Freund and Weinhold (2004) estimate the effect of Internet on the growth in a country's trade in goods. Their model indicates that the Internet contributed one percentage point to annual export growth on average in their panel of 56 countries between 1997 and 1999. Their panel dataset includes developing countries, though they do not estimate different effects for developing and high income countries. Clarke and Wallsten (2006) utilize cross-sectional data on the total exports of goods in 2001 for 26 high income countries and 72 developing countries. They find that there were significant positive effects of the Internet on the export flows from developing countries to high income countries. Liu and Nath (2013) model the use of the Internet in 40 emerging market economies between 1995 and 2010. They find that Internet subscriptions and Internet hosts had a significant positive effect on the countries' exports of goods. Riker (2014) models the link between the number of broadband users in a country and the country's openness to international trade in goods and services. His econometric model indicates that the growth in broadband use between 2000 and 2011 increased a country's trade-to-GDP ratio by 4.21 percentage points on average, with much larger effects in high income countries (a 10.21 percentage point increase on average) than in developing countries (a 1.67 percentage point increase on average). None of these studies specifically models product-level entry into export markets, and none focuses on exports to the U.S. market.

This paper also contributes to the line of research that models the export decisions of firms in developing countries but does not specifically address the role of the Internet in trade facilitation.

[3] The variation in these estimates across countries mostly reflects the differences in the countries' number of Internet users in 2013.

In some cases, these studies are based on aggregate trade flow data, as in Helpman, Melitz, and Rubinstein (2008), but more often they use firm-level data. Examples include Roberts and Tybout (1997), Das, Roberts, and Tybout (2007), and Eaton, Eslava, Kugler and Tybout (2007) for exports from Colombia, Rodríguez-Pose, Tselios, Winkler, and Farole (2013) for exports from Indonesia, Mukim (2012) and Mallick and Yang for exports from India, and Farole and Winkler (2014) for exports from a large number of middle income and low income countries. These studies find that entry costs and uncertainty are important factors in decisions to export. These factors are generally affected by Internet use: the Internet can create new cross-border business opportunities, reduce ongoing logistical costs, and reduce uncertainty about foreign markets.

The rest of this paper is organized into five sections. Section 2 describes that data sources and reports a set of summary statistics. Section 3 describes the econometric methodology. Section 4 reports the estimated effects of the Internet on the middle income countries' product-level entry into the U.S. market. Section 5 simulates the effects of increasing Internet use in the middle income countries to the current levels in high income countries. Section 6 provides concluding remarks.

## 2. Data Sources and Summary Statistics

We focus on the exports of technologically advanced U.S. manufacturing goods, represented by chapters 84 through 90 in the U.S. Harmonized Tariff Schedule (HTS), from 87 middle income countries. These HTS chapters include machinery, electronics, transportation equipment, and instruments.

The measure of product-level entry is based on U.S. import data at the HTS six-digit level for each year and each exporting country from the U.S. International Trade Commission's Trade Dataweb. We classify a country-product pair as entering the U.S. market in a particular year if the middle income country exported the product to the United States in that year but had no exports of the product to the United States in the prior two years.[4] We define the product entry rate for each country in each year as the ratio of its number of product-level entries to its total number of potential entries from the country.

[4] A potential entrant is defined as a country-product pair with no exports to the United States in the prior two years. The other requirement in our definition of potential entrant is that there were some U.S. imports from other countries within the same HTS six-digit classification in the prior years. This ensures that the apparent new product-level entry is not simply a change in the HTS classifications.

Table 1 reports the average product entry rate of the middle income countries for each year from 2001 to 2013. There was an upward trend in this average entry rate, with business cycle declines at the beginning of the period and in 2007-2009. The average entry rate ranged from a low of 12.53% in 2002 to a high of 18.23% in 2012.

We use the number of Internet users per 100 people from the World Bank's World Development Indicators as a measure of the strength of the middle income country's digital connection to potential export markets. Figure 1 illustrates the growth in the number of Internet users in the middle income countries between 2000 and 2013. The median number of Internet users rose from 2.4 per 100 in 2000 to 43.6 per 100 in 2013, and the distribution across the middle income countries widened. In 2000, the difference between the 25$^{th}$ and 75$^{th}$ percentile values was 9.1 per 100. By 2013, the difference was 51.5 per 100.

Table 2 reports the number of Internet users per 100 people in 2000 and 2013 for each middle income country. Within the countries, the average increase in the number of Internet users over this period was 31.1 users per 100 people. By 2013, the numbers of users exceeded 60 per 100 in Albania, Bosnia and Herzegovina, Hungary, Lebanon, Macedonia, and Malaysia. In contrast, the numbers of users remained below 8 per 100 in Cameroon, Cote d'Ivoire, Lesotho, Mauritania, Papua New Guinea, and the Republic of the Congo.

The econometric model also uses data on days to export from the World Bank's Doing Business report as a measure of the efficiency of export logistics in the middle income countries.[5] The days to export measure is available for all 87 countries in 2007, the mid-point of our period of analysis. Figure 2 depicts the distribution of this country-level measure. The values that are shaded in black (18 days or less) are the bottom quartile of the distribution. In the econometric analysis below, we classify the countries in this bottom quartile as countries with highly efficient export logistics.

The model also uses annual country-level measures of real GDP and bilateral real exchange rates from the IMF's World Economic Outlook database.

[5] This measure is an estimate of the number of calendar days required to export a standardized cargo of goods by sea, assuming full effort to minimize delay. The survey-based estimates include time for document preparation, customs, inland transport, and port handling.

## 3. Econometric Methodology

The dependent variable in the econometric model is product-level entry into the U.S. market. It is a binary variable that takes a value of zero or one for each of the country-product-years that are potential entries, as defined in the last section. We model the entry decisions as discrete choices using a logit model.

The model includes several explanatory variables that vary significantly across the middle income countries and over the years. The number of Internet users per 100 people in the country in the year is expected to have a positive effect on the probability of entering the U.S. market. The growth rate of real GDP in the United States in the year is expected to have a positive effect on product-level entry, reflecting growth in aggregate demand in the U.S. market, since the Internet can create new cross-border business opportunities, reduce ongoing logistical costs, and reduce uncertainty about foreign markets. We expect that the changes in the Internet measure within a country over time mostly reflect the improvements in communications with potential export markets. However, they could also reflect changes in the countries' technical capability to produce the goods.[6]

The growth rate of real GDP of the potential entrant is expected to have a positive effect, reflecting growth in productivity and resource availability in the potential entrant. The rate of appreciation of the potential entrant's bilateral real exchange rate with the United States is expected to have a negative effect on the probability of product-level entry (and conversely a real depreciation of the potential entrant's currency is expected to have a positive effect on product-level entry). The model also includes a set of fixed effects for the HTS chapters.[7]

Equation (1) is the logit model of the probability of entry of product $i$ from country $c$ in year $t$.

$$Prob_{ict} = \frac{e^{\beta_0+\beta_1 NIU_{ct}+\beta_2\, GRGDPUS_t+\beta_3\, GRGDP_{ct}+\beta_4\, RAPPREC_{ct}+\sum_j \delta_j IND_{ij}}}{1+e^{\beta_0+\beta_1 NIU_{ct}+\beta_2\, GRGDPUS_t+\beta_3\, GRGDP_{ct}+\beta_4\, RAPPREC_{ct}+\sum_j \delta_j IND_{ij}}} \qquad (1)$$

$NIU_{ct}$ represents the number of Internet users in country $c$ in year $t$. $GRGDPUS_t$ is the growth in the real GDP of the United States in year $t$. $GRGDP_{ct}$ is the growth in the real GDP of country $c$ in year $t$. $RAPPREC_{ct}$ is the appreciation of country $c$'s bilateral real exchange with the United States

[6] If technological capabilities are fairly constant from one year to the next within each country, then they will not be a determinant of product-level entry in the econometric model, because we define entry as a *change over time*, from no exports in years $t-1$ and $t-2$ to exports in year $t$. In this case, the estimated effect of Internet use would only reflect the improvements in communications.

[7] An HTS chapter is the two-digit HTS classification of the product.

in year $t$. $IND_{ij}$ is an indicator variable that is equal to one if product $i$ is in HTS chapter $j$ and is equal to zero otherwise.

To investigate the possibility of complementarity between Internet use and the efficiency of the middle income country's export logistics, we consider an alternative specification that includes an interaction between these two variables.

$$Prob_{ict} = \frac{e^{\gamma_0+\gamma_1 NIU_{ct}+\gamma_2(NIU_{ct}\times HEFF_c)+\gamma_3 GRGDPUS_t+\gamma_3 GRGDP_{ct}+\gamma_4 RAPPREC_{ct}+\sum_j \theta_j IND_{ij}}}{1+e^{\gamma_0+\gamma_1 NIU_{ct}+\gamma_2(NIU_{ct}\times HEFF_c)+\gamma_3 GRGDPUS_t+\gamma_3 GRGDP_{ct}+\gamma_4 RAPPREC_{ct}+\sum_j \theta_j IND_{ij}}} \quad (2)$$

$HEFF_c$ is an indicator variable that is equal to one if the export logistics of country $c$ are highly efficient according to the days to export measure and is equal to zero otherwise. We expect that the positive effect on the number of Internet users is larger for the countries with highly efficient export logistics.

## 4. Econometric Estimates

Table 3 reports the estimated coefficients of the logit models, as well as the average marginal effect of each of the explanatory variables. The standard errors of the estimates are reported in parentheses. They are corrected for clustering by country-year. We report the Akaike Information Criterion (AIC) for each of the non-linear models as a measure of fit that is comparable across the alternative model specifications. The AIC value is declining in the log-likelihood value and in the number of degrees of freedom of the estimate, so the specification with the lowest AIC value is the preferred model.

Model 1 includes the Internet measure, the set of HTS chapter fixed effects, and a constant.[8] In the first column of estimates, the coefficient on the Internet measure is positive and statistically significant at the 1% level. In the second column of estimates, the average marginal effect illustrates the economic significance of the Internet: every 10 additional Internet users per 100 people increase the probability of the country's product-level entry into the U.S. market by almost one percentage point. The $\chi^2$ statistic at the bottom of Table 3 indicates that the HTS chapter fixed effects are jointly significant.

[8] In all of the econometric specifications, HTS chapter 84 is the omitted category.

Model 2 adds three explanatory variables. The coefficients on the growth rate of real GDP in the United States and the growth rate of real GDP in the potential entrant are positive and statistically significant at the 1% level. The coefficient on the appreciation of the potential entrant's bilateral real exchange rate with the United States is negative and statistically significant at the 5% level. The AIC favors model 2 over model 1. The average marginal effect of the Internet is slightly larger for model 2, and again the $\chi^2$ statistic indicates that the HTS chapter fixed effects are jointly significant.

Table 4 reports two specifications that include interactions between the measure of Internet use and an indicator for whether the country's export logistics are highly efficient. The coefficient on this interaction term is positive and statistically significant at the 1% level, so the positive effect of the Internet is larger in the countries that have highly efficient export logistics. According to the AIC, model 4 with the larger set of explanatory variables is a better fit than model 3 (or model 1 or 2). The average marginal effect of Internet use in model 4 indicates that the probability of product-level entry increases by 1.18 percentage points for every 10 additional Internet users per 100 people in the countries that had highly efficient export logistics, and by 0.65 percentage points in the countries that had less efficient export logistics.[9]

Table 5 reports a sensitivity analysis that replaces the Internet measure with its one year lagged value. These alternative models allow for lagged entry in response to the increase in Internet use.[10] The estimates in Table 5 are similar in sign and magnitude to their counterparts in Table 4. The average marginal effects in Table 5 are slightly larger.

Table 6 reports a sensitivity analysis that redefines entry: the alternative models define potential entries to include all country-product pairs with no U.S. market presence in the prior year, rather than all country-product pairs with no U.S. market presence in the prior two years. This broader definition includes country-products that reenter after a single-year absence from the U.S. market, so the redefinition increases the number of potential entrants and the size of the estimation sample. The average marginal effect of the number of Internet users is larger in Table 6 than its counterpart in Table 4, but the signs and significance levels of the coefficients are similar.

[9] The first estimate is the sum of the coefficients on the Internet term (0.65) and the interaction term (0.53).

[10] The lagged value also mitigates potential endogeneity bias in the econometric estimates.

## 5. Simulations

Finally, we use the coefficient estimates from model 4 to simulate the increase in each country's probability of product-level entry if the country's number of Internet users increased to 75 users per 100 people. This value is above the number of Internet users in all of the middle income countries in 2013, but it is below the number of Internet users in most high income countries in that year. Equation (3) is the simulated increase in the probability of product-level entry for country $c$.

$$\Delta Prob_{c\,2013} = AME_c\,(75 - NIU_{c\,2013}) > 0 \qquad (3)$$

$AME_c$ represents the average marginal effect of the number of Internet users in country $c$ from econometric model 4.

Table 7 reports the results of these calculations. The increase in the probability of product-level entry into the U.S. market varies across the countries, depending on the country's number of Internet users in 2013 and on the efficiency of the country's export logistics. The increase in the probability of product-level entry ranges from 0.28 percentage points for Hungary to 7.07 percentage points for India, with an average across all 87 countries of 3.12 percentage points.

## 6. Conclusions

We have examined the possibility that Internet use can reduce barriers to international trade and can increase exports from developing countries to the United States. We have estimated an econometric model that supports this theory. The effects on the probability of entry are economically and statistically significant, though they are not large. The model indicates that the Internet facilitates trade and complements efforts to increase the efficiency of export logistics. Our sensitivity analysis suggests that the estimates are fairly robust.

We have applied the econometric model in forward-looking simulations that project the increase in the probability of product entry into the U.S. market if the middle income countries were to increase their numbers of Internet users to the levels that currently prevail in high income countries. The average increase across all of the 87 middle income countries is 3.12 percentage points.

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**Figure 1: Distribution of Internet User Rates across Middle Income Countries and Over Time**

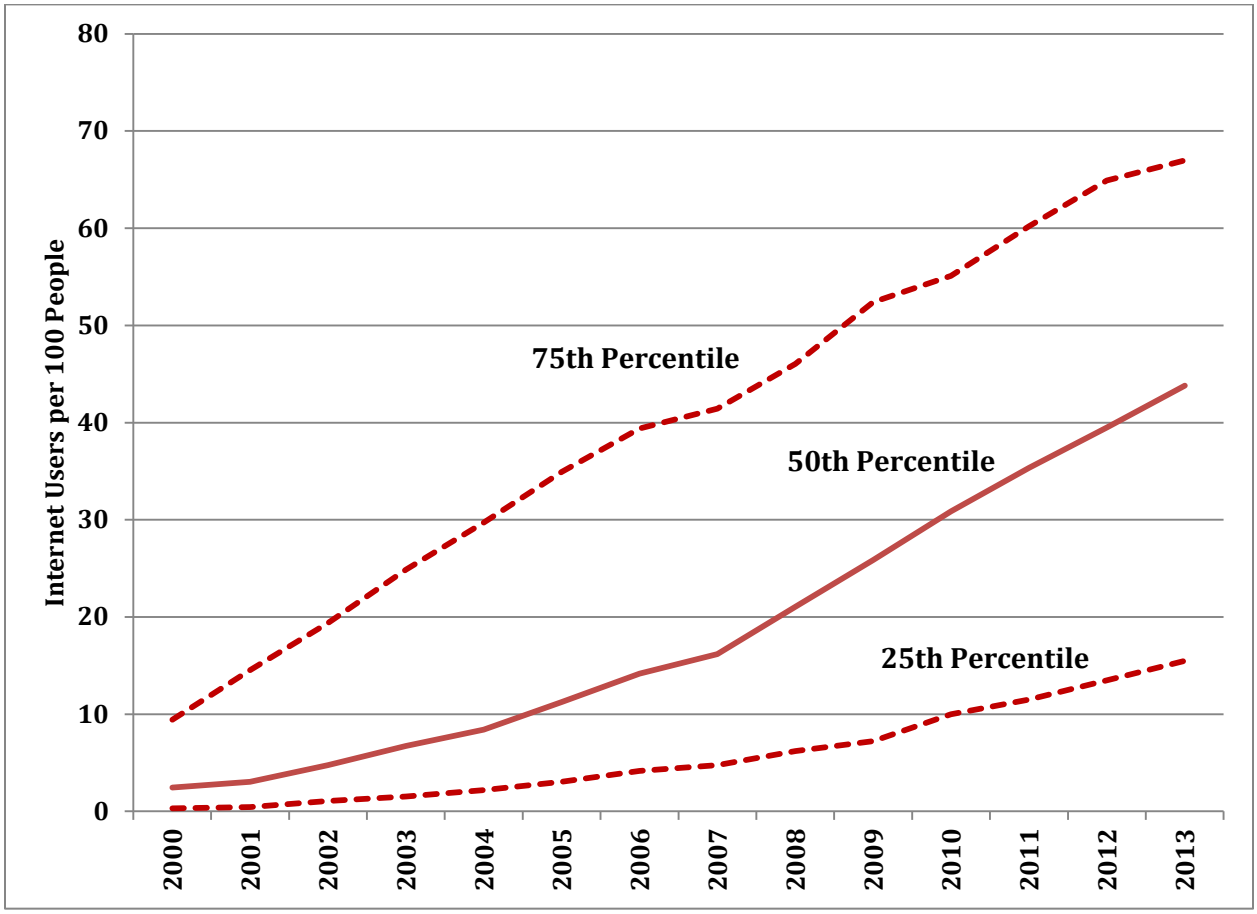

**Figure 2: Distribution of the Middle Income Countries' Days to Export**

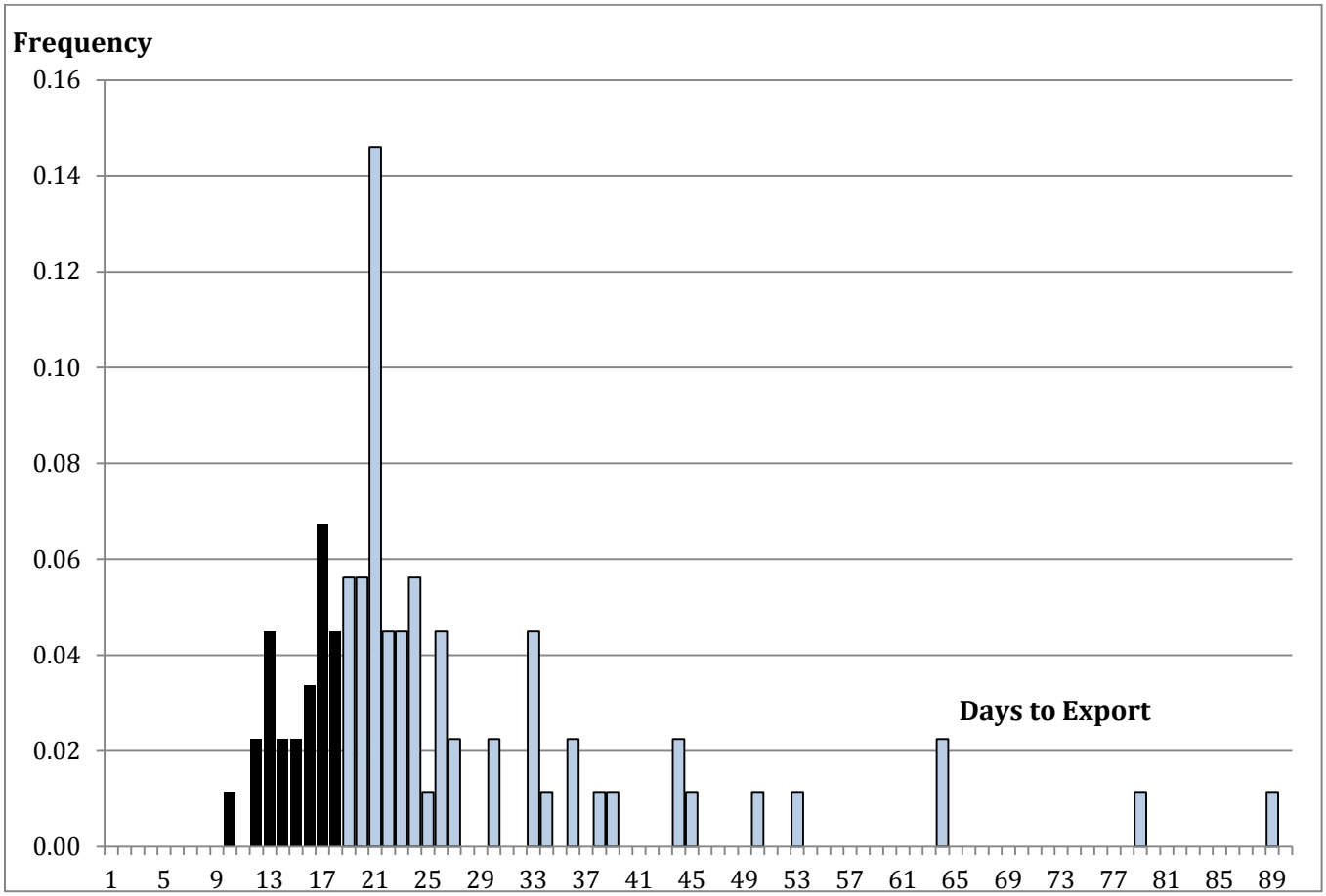

**Table 1: The Average Product Entry Rate over Time**

| Year | Potential Entries | Entries | Entry Rate (%) |
|---|---|---|---|
| 2001 | 15,099 | 1,998 | 13.23 |
| 2002 | 14,684 | 1,840 | 12.53 |
| 2003 | 14,480 | 1,985 | 13.71 |
| 2004 | 14,348 | 2,185 | 15.23 |
| 2005 | 13,775 | 2,258 | 16.39 |
| 2006 | 13,202 | 2,256 | 17.09 |
| 2007 | 12,818 | 2,010 | 15.68 |
| 2008 | 11,645 | 1,718 | 14.75 |
| 2009 | 12,458 | 1,733 | 13.91 |
| 2010 | 12,842 | 2,138 | 16.65 |
| 2011 | 12,684 | 2,179 | 17.18 |
| 2012 | 12,187 | 2,222 | 18.23 |
| 2013 | 11,712 | 1,941 | 16.57 |

**Table 2: Internet Users per 100 in Middle Income Countries**

| Country | Internet Users in 2000 | Internet Users in 2013 | Country | Internet Users in 2000 | Internet Users in 2013 |
|---|---|---|---|---|---|
| Albania | 0.1 | 60.1 | Lebanon | 8.0 | 70.5 |
| Algeria | 0.5 | 16.5 | Lesotho | 0.2 | 5.0 |
| Angola | 0.1 | 19.1 | Macedonia, FYR | 2.5 | 61.2 |
| Argentina | 7.0 | 59.9 | Malaysia | 21.4 | 67.0 |
| Armenia | 1.3 | 46.3 | Maldives | 2.2 | 44.1 |
| Azerbaijan | 0.1 | 58.7 | Marshall Islands | 1.5 | 11.7 |
| Belarus | 1.9 | 54.2 | Mauritania | 0.2 | 6.2 |
| Belize | 6.0 | 31.7 | Mauritius | 7.3 | 39.0 |
| Bhutan | 0.4 | 29.9 | Mexico | 5.1 | 43.5 |
| Bolivia | 1.4 | 39.5 | Micronesia, Fed. States | 3.7 | 27.8 |
| Bosnia and Herzegovina | 1.1 | 67.9 | Moldova | 1.3 | 48.8 |
| Botswana | 2.9 | 15.0 | Mongolia | 1.3 | 17.7 |
| Brazil | 2.9 | 51.6 | Morocco | 0.7 | 56.0 |
| Bulgaria | 5.4 | 53.1 | Namibia | 1.6 | 13.9 |
| Cabo Verde | 1.8 | 37.5 | Nicaragua | 1.0 | 15.5 |
| Cameroon | 0.3 | 6.4 | Nigeria | 0.1 | 38.0 |
| China | 1.8 | 45.8 | Panama | 6.6 | 42.9 |
| Colombia | 2.2 | 51.7 | Papua New Guinea | 0.8 | 6.5 |
| Congo, Rep. | 0.0 | 6.6 | Paraguay | 0.7 | 36.9 |
| Costa Rica | 5.8 | 46.0 | Peru | 3.1 | 39.2 |
| Cote d'Ivoire | 0.2 | 2.6 | Philippines | 2.0 | 37.0 |
| Djibouti | 0.2 | 9.5 | Romania | 3.6 | 49.8 |
| Dominica | 8.8 | 59.0 | Samoa | 0.6 | 15.3 |
| Dominican Republic | 3.7 | 45.9 | Sao Tome and Principe | 4.6 | 23.0 |
| Ecuador | 1.5 | 40.4 | Senegal | 0.4 | 20.9 |
| Egypt, Arab Republic | 0.6 | 49.6 | Seychelles | 7.4 | 50.4 |
| El Salvador | 1.2 | 23.1 | Solomon Islands | 0.5 | 8.0 |
| Fiji | 1.5 | 37.1 | South Africa | 5.3 | 48.9 |
| Gabon | 1.2 | 9.2 | Sri Lanka | 0.6 | 21.9 |
| Georgia | 0.5 | 43.1 | Suriname | 2.5 | 37.4 |
| Ghana | 0.2 | 12.3 | Swaziland | 0.9 | 24.7 |
| Guatemala | 0.7 | 19.7 | Syrian Arab Republic | 0.2 | 26.2 |
| Guyana | 6.6 | 33.0 | Thailand | 3.7 | 28.9 |
| Honduras | 1.2 | 17.8 | Tonga | 2.4 | 35.0 |
| Hungary | 7.0 | 72.6 | Tunisia | 2.8 | 43.8 |
| India | 0.5 | 15.1 | Turkey | 3.8 | 46.3 |
| Indonesia | 0.9 | 15.8 | Ukraine | 0.7 | 41.8 |
| Iran | 0.9 | 31.4 | Uzbekistan | 0.5 | 38.2 |
| Jamaica | 3.1 | 37.8 | Vanuatu | 2.1 | 11.3 |
| Jordan | 2.6 | 44.2 | Venezuela, RB | 3.4 | 54.9 |
| Kazakhstan | 0.7 | 54.0 | Vietnam | 0.3 | 43.9 |
| Kiribati | 1.8 | 11.5 | Yemen, Rep. | 0.1 | 20.0 |
| Kyrgyz Republic | 1.0 | 23.4 | Zambia | 0.2 | 15.4 |
| Lao PDR | 0.1 | 12.5 | | | |

**Table 3: Econometric Estimates**

Logit model, with Entry ∈ {0,1} as the Dependent Variable

| | **MODEL 1** | | **MODEL 2** | |
|---|---|---|---|---|
| | Logit Coefficients | Average Marginal Effects | Logit Coefficients | Average Marginal Effects |
| Number of Internet Users | 0.00778<br>(0.00086)** | 0.00099<br>(0.00011)** | 0.00798<br>(0.00085)** | 0.00102<br>(0.00011)** |
| Growth Rate of US Real GDP | | | 3.30595<br>(0.57352)** | 0.42043<br>(0.07320)** |
| Growth Rate of the Real GDP of the Exporter | | | 0.77481<br>(0.25837)** | 0.09853<br>(0.03292)** |
| Real Appreciation of the Exporter's Currency | | | -0.76250<br>(0.34604)* | -0.09697<br>(0.04412)* |
| HTS Chapter 85 | 0.08186<br>(0.01863)** | 0.01043<br>(0.00238)** | 0.08056<br>(0.01863)** | 0.01025<br>(0.00237)** |
| HTS Chapter 86 | -0.07212<br>(0.08333) | -0.00919<br>(0.01062) | -0.06924<br>(0.08326) | -0.00881<br>(0.01058) |
| HTS Chapter 87 | -0.08586<br>(0.03208)** | -0.01094<br>(0.00410)** | -0.08405<br>(0.03204)** | -0.01069<br>(0.00408)** |
| HTS Chapter 88 | -0.14198<br>(0.07548) | -0.01810<br>(0.00963) | -0.15175<br>(0.07543)* | -0.01930<br>(0.00961)* |
| HTS Chapter 89 | -0.10151<br>(0.08249) | -0.01294<br>(0.01050) | -0.11155<br>(0.08281) | -0.01419<br>(0.01052) |
| HTS Chapter 90 | 0.07122<br>(0.02119)** | 0.00908<br>(0.00270)** | 0.07207<br>(0.02117)** | 0.00917<br>(0.00270)** |
| Constant | -1.91213<br>(0.02448)** | | -2.03851<br>(0.02566)** | |
| Number of Obs.<br>AIC<br>$\chi^2$ (6) | 162,518<br>137,235.7<br>43.66<br>(0.0000) | 162,518 | 162,518<br>136,915.8<br>43.88<br>(0.0000) | 162,518 |

Notes: The omitted category is HTS Chapter 84. The standard errors are corrected for clustering by country-year. One asterisk indicates that the coefficient is significantly different from zero at the 5% level. Two indicates that the coefficient is significantly different from zero at the 1% level.

**Table 4: Additional Econometric Estimates with Interaction Terms**

Logit Model with Entry $\in \{0,1\}$ as the Dependent Variable

| | **MODEL 3** | | **MODEL 4** | |
|---|---|---|---|---|
| | Logit Coefficients | Average Marginal Effects | Logit Coefficients | Average Marginal Effects |
| Number of Internet Users | 0.00471<br>(0.00126)** | 0.00060<br>(0.00016)** | 0.00514<br>(0.00124)** | 0.00065<br>(0.00016)** |
| Internet Users × Highly Efficient | 0.00449<br>(0.00117)** | 0.00057<br>(0.00015)** | 0.00415<br>(0.00114)** | 0.00053<br>(0.00014)** |
| Growth Rate of US Real GDP | | | 3.23010<br>(0.56721)** | 0.41061<br>(0.07231)** |
| Growth Rate of the Real GDP of the Exporter | | | 0.76364<br>(0.25768)** | 0.09707<br>(0.03281)** |
| Real Appreciation of the Exporter's Currency | | | -0.74071<br>(0.33950)* | -0.09416<br>(0.04246)* |
| HTS Chapter 85 | 0.08711<br>(0.01862)** | 0.01110<br>(0.00238)** | 0.08540<br>(0.01861)** | 0.01086<br>(0.00237)** |
| HTS Chapter 86 | -0.07618<br>(0.08324) | -0.00971<br>(0.01060) | -0.07311<br>(0.08317) | -0.00929<br>(0.01057) |
| HTS Chapter 87 | -0.08695<br>(0.03204)** | -0.01108<br>(0.00409)** | -0.08500<br>(0.03200)** | -0.01081<br>(0.00408)** |
| HTS Chapter 88 | -0.13867<br>(0.07550) | -0.01767<br>(0.00963) | -0.14849<br>(0.07543)* | -0.01888<br>(0.00960)* |
| HTS Chapter 89 | -0.10763<br>(0.08258) | -0.01371<br>(0.01051) | -0.11718<br>(0.08291) | -0.01490<br>(0.01053) |
| HTS Chapter 90 | 0.07555<br>(0.02126)** | 0.00962<br>(0.00271)** | 0.07602<br>(0.02125)** | 0.00966<br>(0.00270)** |
| Constant | -1.90239<br>(0.02469)** | | -2.02755<br>(0.02589)** | |
| Number of Obs.<br>AIC<br>$\chi^2$ (6) | 162,528<br>137,169.9<br>48.26<br>(0.0000) | 162,528 | 162,528<br>136,860.0<br>48.11<br>(0.0000) | 162,528 |

**Table 5: Sensitivity Analysis with the Lagged Number of Internet Users**

Logit Model with Entry $\in \{0,1\}$ as the Dependent Variable

| | **MODEL 5** | | **MODEL 6** | |
|---|---|---|---|---|
| | Logit Coefficients | Average Marginal Effects | Logit Coefficients | Average Marginal Effects |
| Lagged Number of Internet Users | 0.00395<br>(0.00145)** | 0.00050<br>(0.00018)** | 0.00598<br>(0.00145)** | 0.00076<br>(0.00018)** |
| Internet Users × Highly Efficient | 0.00475<br>(0.00139)** | 0.00060<br>(0.00018)** | 0.00406<br>(0.00136)** | 0.00052<br>(0.00017)** |
| Growth Rate of US Real GDP | | | 3.50047<br>(0.57712)** | 0.44474<br>(0.07356)** |
| Growth Rate of the Real GDP of the Exporter | | | 0.95500<br>(0.26208)** | 0.12133<br>(0.03384)** |
| Real Appreciation of the Exporter's Currency | | | -0.88807<br>(0.34374)* | -0.11283<br>(0.04377)* |
| HTS Chapter 85 | 0.08548<br>(0.01865)** | 0.01089<br>(0.00238)** | 0.08582<br>(0.01866)** | 0.01090<br>(0.00238)** |
| HTS Chapter 86 | -0.07188<br>(0.08322) | -0.00916<br>(0.01060) | -0.07077<br>(0.08312) | -0.00899<br>(0.01056) |
| HTS Chapter 87 | -0.08910<br>(0.03217)** | -0.01135<br>(0.00411)** | -0.08710<br>(0.03213)** | -0.01107<br>(0.00409)** |
| HTS Chapter 88 | -0.13399<br>(0.07565) | -0.01707<br>(0.00965) | -0.14716<br>(0.07563) | -0.01870<br>(0.00962) |
| HTS Chapter 89 | -0.10560<br>(0.08283) | -0.01345<br>(0.01054) | -0.11772<br>(0.08321) | -0.01496<br>(0.01056) |
| HTS Chapter 90 | 0.07500<br>(0.02124)** | 0.00955<br>(0.00271)** | 0.07747<br>(0.02124)** | 0.00984<br>(0.00270)** |
| Constant | -1.86693<br>(0.02336)** | | -2.03334<br>(0.02693)** | |
| Number of Obs.<br>AIC<br>$\chi^2$ (6) | 162,465<br>137,162.7<br>47.17<br>(0.0000) | 162,465 | 162,465<br>136,762.4<br>48.69<br>(0.0000) | 162,465 |

**Table 6: Sensitivity Analysis with an Alternative Definition of Entry**

Logit Model with Entry $\in \{0,1\}$ as the Dependent Variable

| | **MODEL 7** | | **MODEL 8** | |
|---|---|---|---|---|
| | Logit Coefficients | Average Marginal Effects | Logit Coefficients | Average Marginal Effects |
| Number of Internet Users | 0.00527<br>(0.00132)** | 0.00074<br>(0.00019)** | 0.00668<br>(0.00129)** | 0.00093<br>(0.00018)** |
| Internet Users × Highly Efficient | 0.00571<br>(0.00120)** | 0.00080<br>(0.00017)** | 0.00485<br>(0.00117)** | 0.00068<br>(0.00016)** |
| Growth Rate of US Real GDP | | | 6.08045<br>(0.76731)** | 0.84701<br>(0.10684)** |
| Growth Rate of the Real GDP of the Exporter | | | 2.46901<br>(0.32599)** | 0.34393<br>(0.04547)** |
| Real Appreciation of the Exporter's Currency | | | -2.4446<br>(0.40685)** | -0.34051<br>(0.05694)** |
| HTS Chapter 85 | 0.07735<br>(0.01727)** | 0.01089<br>(0.00243)** | 0.07573<br>(0.01718)** | 0.01055<br>(0.00239)** |
| HTS Chapter 86 | -0.12228<br>(0.07296) | -0.01722<br>(0.01027) | -0.12864<br>(0.07376) | -0.01792<br>(0.01027) |
| HTS Chapter 87 | -0.11460<br>(0.02763)** | -0.01614<br>(0.00391)** | -0.11168<br>(0.02770)** | -0.01556<br>(0.00387)** |
| HTS Chapter 88 | -0.14404<br>(0.06319)* | -0.02029<br>(0.00890)* | -0.16817<br>(0.06385)** | -0.02343<br>(0.00890)** |
| HTS Chapter 89 | -0.03717<br>(0.06856) | -0.00523<br>(0.00965) | -0.06753<br>(0.06920) | -0.00941<br>(0.00963) |
| HTS Chapter 90 | 0.07040<br>(0.01912)** | 0.00991<br>(0.00269)** | 0.07089<br>(0.01901)** | 0.00987<br>(0.00265)** |
| Constant | -1.77771<br>(0.02635)** | | -2.07434<br>(0.02961)** | |
| Number of Obs. | 198,492 | 198,492 | 198,492 | 198,492 |
| AIC | 180,477.8 | | 178,626.4 | |
| $\chi^2$ (6) | 60.47<br>(0.0000) | | 63.07<br>(0.0000) | |

**Table 7: Simulated Effects of Increasing Internet Use to 75 per 100, in Percentage Points**

| Country | Frequency of Entry in 2013 | Increase in Probability of Entry | Country | Frequency of Entry in 2013 | Increase in Probability of Entry |
|---|---|---|---|---|---|
| Albania | 15.3 | 0.97 | Lebanon | 15.3 | 0.29 |
| Algeria * | 14.5 | 6.90 | Lesotho | 50.0 | 4.55 |
| Angola | 1.3 | 3.63 | Macedonia, FYR * | 19.8 | 1.63 |
| Argentina * | 16.6 | 1.78 | Malaysia * | 22.0 | 0.95 |
| Armenia | 9.0 | 1.87 | Maldives | 29.2 | 2.01 |
| Azerbaijan | 13.0 | 1.06 | Marshall Islands | 17.8 | 4.11 |
| Belarus | 14.6 | 1.35 | Mauritania | 12.8 | 4.47 |
| Belize | 13.4 | 2.81 | Mauritius * | 12.3 | 4.25 |
| Bhutan | 17.6 | 2.93 | Mexico * | 37.4 | 3.72 |
| Bolivia | 14.3 | 2.31 | Micronesia, Fed. States | 17.4 | 3.07 |
| Bosnia and Herzegovina | 9.3 | 0.46 | Moldova | 10.9 | 1.70 |
| Botswana | 16.0 | 3.90 | Mongolia | 26.4 | 3.72 |
| Brazil * | 23.9 | 2.76 | Morocco * | 13.3 | 2.24 |
| Bulgaria | 19.1 | 1.43 | Namibia | 25.6 | 3.97 |
| Cabo Verde | 16.4 | 2.44 | Nicaragua | 12.6 | 3.87 |
| Cameroon | 13.0 | 4.46 | Nigeria | 21.5 | 2.41 |
| China | 20.0 | 1.90 | Panama * | 19.1 | 3.79 |
| Colombia | 18.0 | 1.51 | Papua New Guinea | 36.6 | 4.45 |
| Congo, Rep. | 23.4 | 4.45 | Paraguay | 24.7 | 2.48 |
| Costa Rica * | 20.4 | 3.43 | Peru | 14.2 | 2.33 |
| Cote d'Ivoire | 13.7 | 4.71 | Philippines * | 16.8 | 4.48 |
| Djibouti | 5.0 | 4.26 | Romania * | 25.9 | 2.98 |
| Dominica * | 6.2 | 1.89 | Samoa | 22.2 | 3.88 |
| Dominican Republic * | 15.4 | 3.43 | Sao Tome and Principe | 11.7 | 3.38 |
| Ecuador | 12.3 | 2.25 | Senegal | 10.6 | 3.52 |
| Egypt, Arab Republic * | 15.3 | 3.00 | Seychelles * | 14.6 | 2.90 |
| El Salvador | 19.4 | 3.37 | Solomon Islands | 3.4 | 4.36 |
| Fiji | 25.0 | 2.46 | South Africa | 14.9 | 1.70 |
| Gabon | 12.2 | 4.28 | Sri Lanka | 15.6 | 3.45 |
| Georgia * | 12.6 | 3.76 | Suriname | 17.2 | 2.44 |
| Ghana | 15.1 | 4.08 | Swaziland | 15.0 | 3.27 |
| Guatemala * | 11.3 | 6.53 | Syrian Arab Republic | 1.4 | 3.17 |
| Guyana | 4.2 | 2.73 | Thailand * | 21.4 | 5.44 |
| Honduras | 17.6 | 3.72 | Tonga | 20.0 | 2.60 |
| Hungary * | 19.8 | 0.28 | Tunisia * | 15.5 | 3.68 |
| India * | 29.7 | 7.07 | Turkey * | 36.3 | 3.39 |
| Indonesia * | 18.9 | 6.98 | Ukraine | 18.0 | 2.16 |
| Iran | 0.0 | 2.83 | Uzbekistan | 15.4 | 2.39 |
| Jamaica | 11.9 | 2.42 | Vanuatu | 4.5 | 4.14 |
| Jordan | 12.7 | 2.00 | Venezuela, RB | 6.4 | 1.31 |
| Kazakhstan | 17.5 | 1.37 | Vietnam | 32.9 | 2.02 |
| Kiribati | 9.1 | 4.13 | Yemen, Rep. | 1.8 | 3.58 |
| Kyrgyz Republic | 3.3 | 3.35 | Zambia | 20.0 | 3.87 |
| Lao PDR | 3.0 | 4.06 | | | |

Note: An asterisk (*) indicates a country with highly efficient export logistics.