

# Study of the Factors Behind the Demand for Country Code Domain Names

Prepared for APTLD



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## Executive Summary

This report explores factors behind ccTLD domain registrations including the role of price. As expected there is strong evidence for increased demand for domains resulting from price decreases or policy changes. However, in the case of the policy changes, i.e., allowing 2<sup>nd</sup> level domain registrations or IDN registrations, these increases are diminished over time likely due to the ending of the "land rush" period. Additionally, there is a high level of variation in effects (*e.g.* price reductions resulting in a 50 to 600 percent increase in demand) that are largely tied to the idiosyncratic makeup of each ccTLD's market.

This report builds upon data gathered by eight ccTLD registries for APTLD for the period of time ranging from January 2003 to July 2007.

All countries exhibit a "time trend" in which the absolute number of domain name registrations (and often the rate as well) has increased over time. This corresponds closely to overall trends within the global domain market.

This report shows that GDP, number of Internet users, and number of com/net domains registered within a country are all important factors associated with the number of ccTLD domain registrations. The policy change of opening up a registry to second level registrations produces an initial demand for new domains but this effect tapers off over time and the policy of allowing IDN domains cannot be statistically tied to new demand for domains. While the policy variable of "Major Marketing Campaign" can be clearly tied to results in specific ccTLDs at certain times, it did not emerge as statistically significant in the models. All these results are extremely robust and explain almost all of the variation within the number of ccTLD domain counts.

While it is not possible to give an overall price elasticity model for all ccTLDs, it is possible to calculate three country level elasticities (BXXX, AXXX and HXXX) based on price change data available. This sample suggests that countries with longer histories of Internet development (BXXX and AXXX) have higher elasticities than those shorter histories (HXXX).

## **Introduction**

### Objectives of Report

This report provides a statistical analysis of the factors behind demand for ccTLD domain names. Specifically, this report explores the following:

- (1) Overall domain name growth trends worldwide;
- (2) Factors behind ccTLD domain registrations worldwide;
- (3) Generalizable factors behind ccTLD domain registrations for eight selected APTLD member registries; and
- (4) Price elasticities of demand for specific APTLD member registries.

### Data Sources and Methods

APTLD provided ZookNIC with data from eight ccTLD registries:

The data was assembled by the registries and included monthly figures from January 2003 to July 2007 (54 observations) for the following variables:

- Total ccTLD Domains Registered
- New ccTLD Domain Registrations
- Price (In local currency)
- Policy: Overseas Registrants Allowed (Yes or No)
- Policy: Multiple Domains per Organization Allowed (Yes or No)
- Policy: Second Level Registrations Allowed (Yes or No)
- Policy: IDN Registrations Allowed (Yes or No)
- Policy: Major Marketing Campaign (Yes or No)

Other data used as independent variables, *e.g.*, population, Internet users, GDP, number of com/net domains registered in a country etc., were assembled by ZookNIC. The data are drawn either from reliable international sources (World Bank, United Nations, ITU) or drawn from ZookNIC's proprietary database on the distribution of com/net registrations.

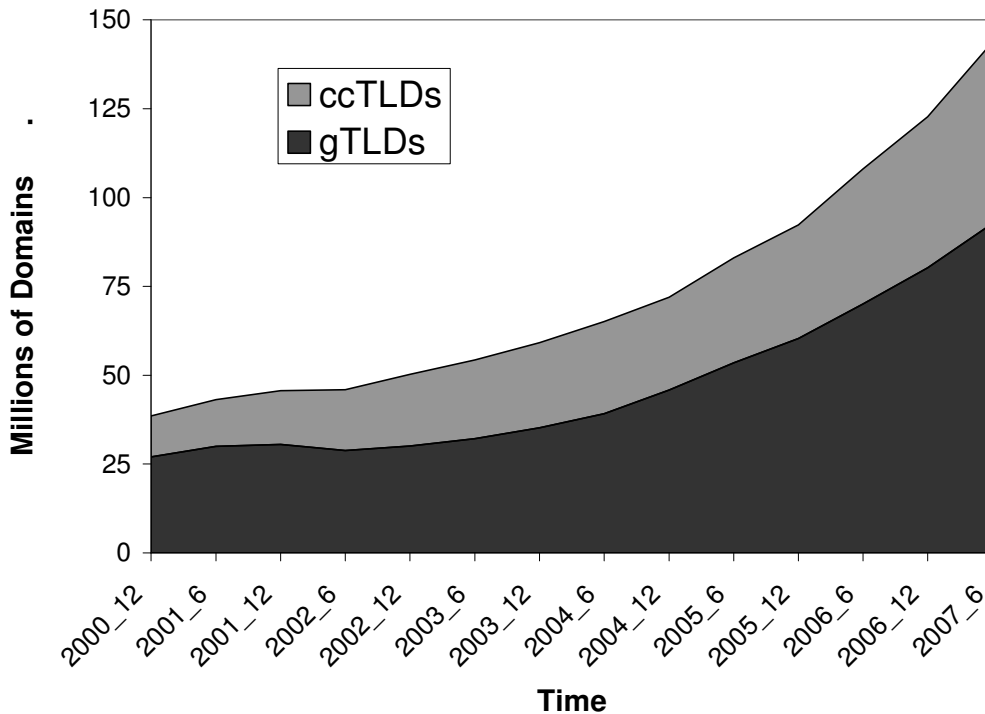
While data was provided by all registries, not all registries provided figures for the "New ccTLD Domain Registrations" variable. Therefore, the principle independent variable used in the regression analysis in this report is "Total ccTLD Domains Registered".

A significant issue with the dataset is that there is a relatively small number of price changes within the data (*i.e.*, the APTLD member ccTLDs in the study had highly static pricing). On average, each ccTLD experienced two price changes during the 54 months under study and some reported no price changes. This produced insufficient variation in the price variable to allow it to be used in the overall models in Part III of this report.

### Part I: Overall Domain Name Growth Trends

At the end of the second quarter of 2007 there were approximately 143 million domains registered world wide (see Figure 1). These were divided between gTLD domains (65 percent) and ccTLD domains (35 percent). Growth rates for both types of domains over the past two and half years have been approximately 40 percent per year which has doubled the number of domains in existence during this 30 month period. There is, however, significant variation within these categories with some TLDs exhibiting very high growth rates (both DXXX and EXXX have experienced approximately 150 percent annual growth during this time) while others post much more modest rates.

**Figure 1, Number of Domains Worldwide**



Moreover, growth rates can be extremely variable from one month to the next. All eight of the APTLD member registries used in this report exhibit a steady acceleration over time in growth rates. In other words, as one moves from 2003 to present, the change in number of domains in a registry increases at a faster rate. This mirrors the overall trend exhibited in Figure 1 and suggest that rather than reaching a saturation point, the domain name market (both generally and for these specific ccTLDs) retains good opportunities for growth.

## **Part II: Factors Behind ccTLD Domain Registrations Worldwide**

The strong growth rates outlined in the previous section leads to the question asked here, *i.e.*, what factors are associated with high levels of ccTLD domain registration? In this exercise, this report only considers one moment in time (2<sup>nd</sup> Quarter 2007) and expands its scope to include all ccTLD registries worldwide with the following exceptions. First, only ccTLD registries with more than 10,000 domains are included. This is both due to data quality issues (it is harder to get good quality independent variables such as Number of Internet users for smaller countries) and the fact that smaller registries are generally operating under very different conditions than larger ones making it an issue of comparing apples to oranges. Second, all "generic" ccTLDs such as nu, ws, cc, tv, to, and tk were eliminated from the dataset. These ccTLD registries have very little to do with the economic conditions of their host country and therefore are not appropriate to include. Third and finally, the United States was removed from the dataset. Its long history of using gTLDs such as .com and much shorter history of an active and open .ccTLD registry make it an extreme outlier from all other countries.

A multivariate linear regression was conducted with the "Number of ccTLD Domain registrations" as the dependent variable. A large number of independent variables (*e.g.*, basic demographic data, measures of technology and Internet use, economic and social indicators, etc.) were considered with an eye towards their usability in the APTLD member registry specific analysis in Part III.

### Model Results

The results of the model are shown in Figure 2. 108 ccTLD registries are included and a combination of four independent variables explains 75 percent of the variation in the number of ccTLD domains in mid 2007. Interestingly, the number of com/net registrations is the most useful variable in modeling ccTLD counts. This suggests that gTLD domains and ccTLD domains are acting more like complementary goods rather than substitutes. While it is likely that this substitution effect is also in play, *i.e.*, someone decides to register a .com rather than a ccTLD and vice-versa, the high correlation between the two is more indicative of parallel markets for products that are fundamentally different. gTLD domains are often cheaper and easier to register but do not provide the sense of national connection that a ccTLD domain provides.

**Figure 2, Global ccTLD Model**

<b>Dependent Variable: Number of ccTLD Domain Registrations</b>			
Number of Obs.		108	
F		81.6	
Adj. R-squared		0.749	
<b>Independent Variable</b>	<b>Coef. (B)</b>	<b>t</b>	
GDP	-549.2	-2.63	***
Internet Users	0.022	2.53	**
Com/Net Registrations	1.45	11.83	***
Price of ccTLD Domain	708.0	0.52	
Constant	(139,289)	-1.17	
* significant at the 90 percent confidence interval			
** significant at the 95 percent confidence interval			
*** significant at the 99 percent confidence interval			

The number of Internet users is also significantly and positively related to ccTLD counts. This meets our expectations as users are one of the best available indicators for the market for domain names. Gross Domestic Product (GDP) also emerges as significant, although in the opposite direction than expected. All things being equal one would expect that a larger GDP would translate into a higher ccTLD counts rather than the negative effect indicated in Figure 2. This, however, is likely due to the high correlation with gTLD registrations which is masking the effect of GDP.

Most interesting for this report is that the price of ccTLDs registrations did not emerge as statistically significant. While it is clear that price does influence demand for domains (see Part III and Part IV) it is not possible to statistically demonstrate this effect at the global level. Instead, the price elasticity of demand is best explored at the individual ccTLD registry level.

### **Part III: Factors of APTLD ccTLD Domain Registrations**

Moving from the general global model of a static point in time, this report now builds a specific model for the eight APTLD member registries which provided data for this project. While there is a great deal of variation in terms of the size and situation among these registries, the relatively large number of observations (8 registries \* 54 months = 432) allow for an informative analysis. It is useful, however, to first highlight some the easily observable patterns in the data.

#### Clear Patterns at the Registry Level

It is relatively straightforward to see clear cause and effect relations between ccTLD actions (*e.g.*, price or policy changes) and demand for domains. Examples of this include:

- When CXXX, DXXX, GXXX and EXXX allowed for 2<sup>nd</sup> Level domain registrations, their average monthly new domain name registrations increased by 500 to 1600 percent over the first few months following the policy change.
- Likewise when CXXX, DXXX, AXXX and EXXX introduced IDN domains, their average monthly new domain name registrations increased by 35 to 100 percent during the first few months after the policy change.
- Major marketing campaigns conducted by DXXX, BXXX and AXXX results in average new monthly domain name registrations increasing by 200 to 500 percent over the first few months following the policy change.
- Finally, price reductions instituted by HXXX and AXXX (as well more modest reductions introduced by BXXX) resulted in their average monthly new domain name registrations increasing by 50 to 600 percent over the first months after of the policy change.

Thus, there is clear empirical evidence of price or policy changes resulting in increase demand for ccTLD domains. However, in the case of the policy changes, *i.e.*, 2<sup>nd</sup> level domain registrations and IDN, these increases in average monthly new registrations diminished over time likely due to the ending of the "land rush" period. Additionally, these examples illustrate the high level of variation in effects (*e.g.* price reductions resulting in a 50 to 600 percent increase in demand) that are largely tied to the idiosyncratic makeup of each ccTLD's market. As a result (and due to the unsuitability of the price variable for the overall model) price effects are not included in this model but are examined in Part IV for specific ccTLDs.

#### Modeling Relations

Although this report had initially planned to use the "Number of new ccTLD registrations" as its dependent variable, it was not available for all eight APTLD member registries. Therefore, these models use the "Total number of Registered ccTLD domains" instead. This increases the size (n) of the data and allows for more robust models. However, models using "Number of new ccTLD registrations" were also run with the same set of independent variables and produce similar, albeit less robust, results.

In addition, dummy variables for each country were included in the model to capture country specific effects. Given the range of registry strategies, market and socio-economic conditions it is important to control for inter-country differences not captured

by the independent variables. These dummy variables emerged as significant in all the models but are NOT included in the result below in order to make them more legible. Please see Appendix A for models that display the coefficients for country dummy variables.

This report now presents a series of models with independent variables added one at a time in order to more clearly outline their effects. These models build upon the findings from Part II and deploy most of the same variables. They do NOT, however, include price as a variable due to the lack of variation in this variable. The models do, however, include the ccTLD policy variables of (a) 2<sup>nd</sup> Level Registrations allowed and (b) IDN Registrations Allowed. The policies of "Overseas Registrants Allowed" and "Multiple Domains per Organization Allowed" were not possible to test as the ccTLDs examined for the most part did not exhibit any changes in policy in this regard. The changes that did take place were limited to a single TLD and did not allow for modeling results. While the policy variable of "Major Marketing Campaign" can be clearly tied to results in specific ccTLDs at certain times, it did not emerge as statistically significant in the models. This is likely do to the wide range of activities and time frame which fit under this label.

A Series of Models

This report now presents a series of five regression models in which each observation represents the conditions for a specific registry in a specific month. Although there are theoretically 432 observations possible from this data set, the number of observations used in the models is lower due to gaps in the data. In all cases, the dependent variable is the Total Number of ccTLD Domain registrations for a ccTLD in a particular month.

In this series of models, independent variables are added one at a time to highlight each one's effect. (Note: keep in mind that the dummy variables for countries are NOT pictured in these models to make their interpretation easier). The first independent variable is GDP and as with the model in Part II, it emerges as a significant variable (see Figure 3) and is positively associated with the number of registered domains. This conforms to expectations that as the overall size of a country's economy grows, so will demand for domains.

**Figure 3, APTLD Registries Model 1**

<b>Dependent Variable: Number of ccTLD Domain Registrations</b>		
Number of Obs.		345
F		5717
Adj. R-squared		0.945
<b>Independent Variables</b>	<b>Coef. (β)</b>	<b>t</b>
GDP	0.08	21.26
Constant	87,483	36.78

(see Appendix A for coefficients for country dummy variables)

The second independent variable to be included is the number of Internet Users in a country and like GDP represents an indicator of the size of potential demand for domains (see Figure 4). It is also significantly and positively associated with the number of registered domains.

**Figure 4, APTLD Registries Model 2**

<b>Dependent Variable: Number of ccTLD Domain Registrations</b>		
Number of Obs.		297
F		4556
Adj. R-squared		0.979
<b>Independent Variables</b>	<b>Coef. (β)</b>	<b>t</b>
GDP	0.07	20.24
Internet Users	11,557	14.26
Constant	34,174	7.94

(see Appendix A for coefficients for country dummy variables)

The third independent variable is the number of com/net domain registrations in a particular country. As discussed previously, gTLD domains are arguably best viewed as a complementary product to ccTLD domains rather than a substitute or competitor. Ownership of a gTLD domain is thus a good indicator of the likelihood of registering a ccTLD domain as well, and this variable is positively and significantly associated with ccTLD domain counts (see Figure 5).

**Figure 5, APTLD Registries Model 3**

<b>Dependent Variable: Number of ccTLD Domain Registrations</b>		
Number of Obs.		297
F		10226
Adj. R-squared		0.985
<b>Independent Variables</b>	<b>Coef. (β)</b>	<b>t</b>
GDP	0.06	23.79
Internet Users	5,754	5.51
Com/Net Registrations	0.19	7.81
Constant	-8,751	-2.00

(see Appendix A for coefficients for country dummy variables)

Moving into the realm of policy, the fourth independent variable to enter the model is when 2<sup>nd</sup> level domain registrations are allowed by a registry (see Figure 6). Because there is generally a land rush whenever a new part of domain space is open, this variable is limited to the first six month following the policy change as this is when the effect is

most likely to be seen. A review of the experiences of CXXX, DXXX GXXX and EXXX confirm this. It is therefore not surprising that this policy change is positively and significantly related to the number of registered ccTLD domains.

**Figure 6, APTLD Registries Model 4**

<b>Dependent Variable: Number of ccTLD Domain Registrations</b>		
Number of Obs.		297
F		9713
Adj. R-squared		0.986
<b>Independent Variables</b>	<b>Coef. (B)</b>	<b>t</b>
GDP	0.06	24.01
Internet Users	5,758	5.66
Com/Net Registrations	0.19	8.09
2nd Level Reg. Allowed	17,233	2.77
Constant	-10,218	-2.28

(see Appendix A for coefficients for country dummy variables)

The fifth and final independent variable to appear is another policy related one, *i.e.*, the decision to allow IDN registrations. The overview of the visible evidenced outline at the beginning of this section, suggested that the IDN policy change is likely to increase demand for domains but at a lower rate than the opening of registration to 2<sup>nd</sup> level domains. This is born out in the model as this policy variable cannot be associated with the number of ccTLD domains in a statistically significant manner. In other words, controlling for other effects, the introduction of IDN domains cannot be tied to an increase in demand for domains.

**Figure 7, APTLD Registries Model 5**

<b>Dependent Variable: Number of ccTLD Domain Registrations</b>			
Number of Obs.		297	
F		9713	
Adj. R-squared		0.986	
<b>Independent Variables</b>	<b>Coef. (β)</b>	<b>t</b>	
GDP	0.06	24.09	***
Internet Users	5,871	5.76	***
Com/Net Registrations	0.18	7.89	***
2nd Level Reg. Allowed	17,232	2.80	***
IDN Reg. Allowed	10,087	0.86	
Constant	-9,293	-2.07	**
* significant at the 90 percent confidence interval			
** significant at the 95 percent confidence interval			
*** significant at the 99 percent confidence interval			

(see Appendix A for coefficients for country dummy variables)

Thus, these models show that GDP, number of Internet users, and number of com/net domains registered within a country are all important factors associated with the number of ccTLD domain registrations. The policy change of opening up a registry to second level registrations produces an initial demand for new domains but this effect tapers off over time and the policy of allowing IDN domains cannot be statistically tied to new demand for domains.

All these models are extremely robust and explain almost all of the variation within the number of ccTLD domain counts. Price was not included in these aggregated models but the examples of BXXX, AXXX, CXXX and HXXX show that decreases in price can be anecdotally associated with increased demand for domains. Thus, the final section of this report looks at country specific price effects and elasticities.

**Part IV: Price Elasticities for Selected APTLD ccTLDs**

This section examines the price elasticity of demand<sup>1</sup> for domains in three ccTLD registries (BXXX, AXXX and HXXX). While it is not possible to give an overall price elasticity model for all ccTLDs, it is possible to calculate three country level elasticities based on the few price changes we have data for. Moreover, given the wide range in the political, economic and social make-ups of the countries involved, such an exercise would not be particularly useful as each ccTLD faces a highly idiosyncratic market.

Elasticities

A key issue is the rate and variation of change. In the case of ccTLD, price elasticity is highly specific to individual registries (see Figures 8 -10) with each one possessing a unique elasticity curve. For example, demand for .BX domains is elastic and higher prices translate into more extreme reductions in demand as a result. AXXX also illustrates this elasticity, albeit its own individual contour. In contrast, demand for HXXX ccTLDs is inelastic. Reliable elasticities were not possible to generate for the other ccTLDs.

**Figure 8, Price Elasticity for BXXX**

Base Price (In Local Currency)	% Drop in Demand Based on 1 % Price Increase in Base Price
2000	1.2%
2250	1.6%
2500	2.1%
2750	3.0%
3000	4.5%
3250	7.7%
3500	20.5%

**Figure 9, Price Elasticity for AXXX**

Base Price (In Local Currency)	% Drop in Demand Based on 1 % Price Increase in Base Price
8500	1.4%
9500	1.9%
10500	2.7%
11500	3.9%
13000	9.2%
14000	33.6%

**Figure 10, Price Elasticity for HXXX**

Base Price (In Local Currency)	% Drop in Demand Based on 1 % Price Increase in Base Price
50	0.4%
60	0.5%
70	0.6%
80	0.8%

<sup>1</sup> Price elasticity of demand measures the relationship between changes in a product's price and demand for that product. Laws of supply and demand predict that when prices rise, demand for a particular product will decrease and vice-versa. Goods that exhibit this relationship are characterized as elastic. Products in which demand remains steady regardless of price are said to be inelastic.

Thus, this limited sample suggests that countries with longer histories of Internet development (BX and AX) have higher elasticities than those shorter histories (HX). In other words, domain buyers are more price sensitive in BXXX and AXXX than HXXX. And this sensitivity to price increases as the base price increases. This is likely tied to higher levels of registrations by individuals and small organizations in the former category vs. larger firms and/or institutions that are doing most of the registrations in the latter.

#### Effects of Price Reductions on Demand for Domains

It is, however, unlikely that any registry will increase prices as the general trend in pricing has been in the opposite direction. Therefore it is useful to calculate the increase of demand that would result from a reduction in price. Again these calculations are based on specific ccTLD registries and the specific current prices of their domains and are as follows:

- A ten percent reduction in the current price for .BX domains would result in an approximate forty percent increase in average monthly new domain name registrations.
- A twenty percent reduction in the current price for .BX domains would result in an approximate seventy five percent increase in average monthly new domain name registrations.
- A ten percent reduction in the current price for .AX domains would result in an approximate thirty percent increase in average monthly new domain name registrations.
- A fifteen percent reduction in the current price for .HX domains would result in a less than one percent increase in average monthly new domain name registrations.

Again these results highlight the elastic demand for .AX and .BX domains and the highly inelastic market for .HX domains.

**Appendix A –Final Model from Part III Displaying Country Dummy Variables**

Because the dummy variables for countries are NOT pictured in these models displayed in Part III this Appendix provides the full listing of all variables included in the model.

**Figure 11, APTLD Registries Model 5 with Country Dummy Variables Displayed**

<b>Dependent Variable: Number of ccTLD Domain Registrations</b>			
Number of Obs.		297	
F		9713	
Adj. R-squared		0.986	
<b>Independent Variables</b>	<b>Coef. (β)</b>	<b>t</b>	
GDP	0.06	24.09	***
Internet Users	5,871	5.76	***
Com/Net Registrations	0.18	7.89	***
2nd Level Reg. Allowed	17,232	2.80	***
IDN Reg. Allowed	10,087	0.86	
Constant	-9,293	-2.07	**
* significant at the 90 percent confidence interval			
** significant at the 95 percent confidence interval			
*** significant at the 99 percent confidence interval			
<b>Country Dummy Variables</b>	<b>Coef. (β)</b>	<b>t</b>	
	-17,216	-4.02	
	-264,640	-4.07	
	296,304	12.55	
	-7,080	-0.69	
	156,141	23.11	
	-529,606	-14.54	
	-42,400	-8.46	
Constant	-9,293	-2.07	