Internet use, institutional quality and economic growth; an explorative study

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Abstract

This paper investigates the determinants of Internet use at a global level and finds that the growth rate of the number of Internet users per household can be explained by Institutional factors and the availability of a telecom infrastructure. Per capita income does not show to have a significant influence on this growth rate. We further analyse the influence of Internet use —next to other factors— on income growth per capita. There we find mixed results in the sense that Internet use is positive related to income growth in medium income countries but this is not the case for low and high income countries. In low income countries, we find a positive effect of the number of cell phones per household and a positive effect of the proportion of irrigated land as percentage of total cultivated land on income growth. In our analysis the goal was to include as many as countries as possible at the cost of detailed data. For instance the effect of R&D and of the general level of schooling on income growth is not taken into account because this would limit the coverage in terms of the number of countries considerable. In this sense it is an explorative study and more and detailed data are needed for further analysis. Especially the dynamics of these relations have to be studied more carefully but this requires time series data for the relevant variables. The results still point towards some policy conclusions:

Introduction

There is a growing literature on explaining world wide Internet use or Internet penetration and its determinants. For instance Dasgupta et al. (2005) find that income per capita can explain difference in Internet use, but this is not the case for Internet intensity as measured by the number of Internet users per telephone mainline. Chinn and Fairly (2004) conclude that next to income, regulatory quality is of great importance in explaining the differences in Internet use around the world. They also find that telecommunication access prices can not explain these differences.

Studies on the relation between investments in ICT in general and in the Internet in particular and economic growth are mainly concentrated on OECD countries. The main methodology applied in these studies stems from a growth accounting framework in which the changes in output growth or in productivity growth are explained by contribution from various input factors among which ICT. Examples of such approach are provided by for instance Jorgenson (2001) and Oliner and Sichel (2000) for the US, Colecchia and Schreyer (2002) for nine OECD countries, Jalava and Pohjola (2002) for some OECD countries, and Daveri (2000; Daveri (2002) and van Ark (2002) for some European countries. So these studies focus on OECD countries and rely heavily on the availability of ICT investment data over a substantial period of time. ICT capital stock data are in general not available for other countries such that this framework cannot be applied for a more global analysis. Although Röller and Waverman (2001) use a different approach in their study on the relation between telecommunication infrastructure and economic growth, their analysis is also limited to 21 OECD countries.

Data description

Our analysis relies mainly on the World Development Indicators from the World Bank, World Bank (2004). Appendix A shows the main indicators we included in the analysis. In order to cover as many countries as possible, the variables used in this paper are limited to those that are available for at least 150 countries.[1] Between 1996 and 2002 the average income per capita worldwide has grown by 2.5% per year on an annual basis. The total sample is split into three different income groups according to the World Bank classification. The medium income countries, which are those who have a per capita income between 2000 and 12000 international $ in 1996, experienced the lowest growth rate of 2%, closely followed by the low income countries with an annual growth rate of 2.1%. The highest growth of 2.8% is experienced by the high income countries. This implies that the income gap has increased in this (rather short) period. This is also confirmed by the standard deviation which increased by almost 3.5%.

Table 1. GDP per capita, country summary

GDP Per Capita	*N*	*Minimum*	*Maximum*	*Average*	*Std. deviation*
1996					
All countries	158	452.19	33449.55	6929.79	7391.53
Low income countries	52	452.19	1930.67	1160.74	419.04
Medium Income countries	73	2106.09	11507.51	5264.43	2232.16
High Income countries	33	12108.27	33449.55	19704.39	5278.36
2002					
All countries	158	463.62	54200.81	7968.55	8938.23
Low income countries	52	463.62	2844.67	1305.33	581.54
Medium Income countries	73	1409.00	11865.48	5903.42	2615.60
High Income countries	33	13545.07	54200.81	23036.50	7747.43
Annual growth rate 1996-2002					
All countries		0.42%	10.34%	2.50%	3.44%
Low income countries		0.42%	7.89%	2.08%	6.46%
Medium Income countries		-5.52%	0.52%	2.02%	2.65%
High Income countries		1.98%	10.34%	2.82%	8.34%

Internet use per household tells a different story. Although internet use is, broadly speaking, higher for higher income countries, the opposite is true for the growth rate of internet use between 1996 and 2001. From Table 2 it is clear that the low income countries are in the uptake phase of the diffusion curve with an annual growth rate of internet users of above 900%. This is well above the growth rates of the medium and high income countries of 268% and 113% respectively. However, one should notice that the Internet use in low income countries is almost absent in 1996 so that a small increase in absolute numbers leads to high growth rates. In 1996, Internet use in high income countries was on average 239 times higher than the Internet use in low income

[1] Since different variables are missing for different countries this does however not mean that the regressions can be carried out over this number of countries.

countries and this ratio reduced to 31 in 2001. In that sense the low income countries are catching up. The same holds true for the medium income countries, although to a lesser extent. That ratio dropped from 9 in 1996 to 4 in 2001.

To get a better understanding of these differences and the driving forces behind them, the next section applies a simple diffusion model to explain the growth rate of internet use.

Table 2. Internet users per household[2]

Internet use per household	*N*	*Minimum*	*Maximum*	*Average*	*Std Deviation*
1996					
All countries	145	0.00%	45.06%	4.20%	8.45%
Low Income countries	39	0.00%	0.36%	0.06%	0.09%
Medium Income countries	69	0.01%	10.79%	1.52%	2.03%
High Income countries	37	0.85%	45.06%	13.55%	12.48%
2001					
All countries	145	0.09%	172.83%	34.31%	41.86%
Low Income countries	39	0.09%	18.94%	2.84%	3.71%
Medium Income countries	69	1.37%	126.30%	21.86%	19.85%
High Income countries	37	15.46%	172.83%	90.68%	40.17%
Annual growth rate 1996-2001					
All countries		2785.71%	56.71%	143.55%	79.07%
Low Income countries		2785.71%	1045.78%	983.40%	829.22%
Medium Income countries		2752.44%	214.16%	268.08%	175.86%
High Income countries		343.09%	56.71%	113.84%	44.40%

Internet use explained

In order to explain internet use as a function of structural variables like economic structure, income per capita, institutional quality and demographic characteristics, we start from a simple adoption process which is described in seminal papers by Griliches (1957) and Mansfield (1961). The number of adopters at a point in time depends on the potential number of the adopters and the actual users according to:

$$\frac{dIUHH_t}{dt} = \alpha.IUHH_t.(\overline{IUHH} - IUHH_{t-1}) \qquad (1)$$

Where IUHH denotes the Internet users per household and a bar denotes the potential number of internet users. In our analysis we use a slightly different form by taking the natural logarithm of the difference between the potential and actual number of Internet users as:

$$\frac{dIUHH_t}{dt} = \alpha.IUHH_t.\left(\ln(\overline{IUHH}) - \ln(IUHH_{t-1})\right) \qquad (2)$$

[2] Only those countries are included for which gdp data are available in 1996 and for which internet use data are available both in 1996 and in 2001

The potential number of users is determined by structural indicators as:

$$\ln(\overline{IUHH}) = \sum_j \beta_j . \ln x_j \quad j \in \{IQ, ES, D, T, GDPPC\} \tag{3}$$

Where IQ denotes variables that represent the Institutional Quality in a country, ES denotes Economic Structure, D denotes demographic structure, T stands for technology and GDPPC stands for GDP per capita.

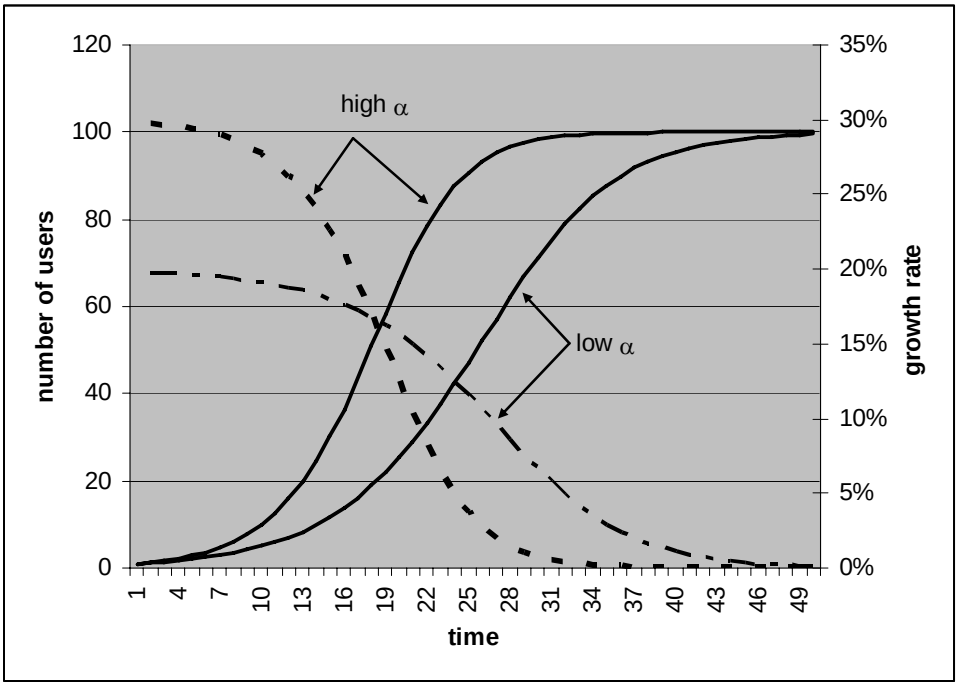
Rearranging this equation and assuming that the potential number of Internet users is determined by lagged structural determinants, and adding a error term we get:

$$\ln(IUHH_t) - \ln(IUHH_{t-1}) = \alpha . \sum_j \beta_j \ln x_{j,t-1} - \alpha \ln(IUHH_{t-1}) + \varepsilon_t \tag{4}$$

So the growth rate of Internet users per household depends on the potential number of Internet users, as represented by a function of structural country characteristics, and the actual Internet users in the previous period. The parameter α describes the diffusion speed of the entire diffusion process which refers to the speed from a certain starting point until full saturation and leaching the upper limit. This is not equal to the actual growth rate of the number of Internet users at a certain point in time. This is illustrated in Figure 1 where the number of users and the growth rate of the number of users is displayed for two different values of α.[3] A high value of α indeed leads to a faster diffusion process, ceterus paribus, but this does not mean that the growth rate of the number of users is at all points in time higher than the growth rate of users in case of a lower value of α. The growth rate of in the beginning of the slower diffusion process is indeed above the growth rate at the end of the faster diffusion process.

[3] This figure is a graphical representation of equation (1) for alpha of 1 and 2 % respectively and an upper limit of the number of Internet users of 100.

Figure 1. Number of users (sold line) and growth rate of number of users (dashed line) for different values of the diffusion speed (α)



A slight rearrangement leads to another interpretation of this equation:

$$\ln(IUHH_t) = \alpha.\sum_j \beta_j \ln x_{j,t-1} + (1-\alpha).\ln(IUHH_{t-1}) + \varepsilon_t \qquad (5)$$

Now we can interpret it as the current number of Internet users per household depending partly on structural characteristics of that country in the past and partly on the number of Internet users in the past. So now the parameter (1-α) incorporates a notion of path dependency. The larger this parameter is, the more the previous number of internet users in that country is an explanation for the current number of users.

The growth of Internet users per household as represented by Equation (4) is estimated for the period between 1996 and 2000. This is done for all countries as well as for the three different income groups. We started with all 40 variables as listed in the appendix and applied the method of backward elimination to reduce this number to the variables which are significant at a 10 percent level. This procedure is repeated for each group of countries.[4] Since not all estimates lead to the same significant variables, the number of countries that are included in the final equation varies along with the availability of data for these countries. The results are displayed in

[4] We started with all countries and with the medium income countries. Only the variables which are significant in these estimates were taken into account in the estimates for the low and high income group since otherwise the number of variables is larger than the number of observations. However, we always include income per capita, foreign direct investment and some demographic variables in all estimates.

Table 3. Overall we find robust estimation statistics based on a varying number of observations ranging from 134 observations in the estimate for all countries to 26 observations for the high income countries. The parameter α is negative and significant in all estimates which is in line with our expectations. As mentioned above, this parameter represents the speed at which the actual number of Internet users is approaching the potential number. This speed is higher for medium and low income countries compared to the high income countries. This difference is not significant, however which implies that the diffusion process in all countries has a similar structure. As explained above, this does not imply that the growth rate of the number of users at a certain point in time is the same for all countries. At the beginning of the process the growth rate is higher than at the end of the diffusion process as is confirmed by the actual growth rates in Table 2. It does also not imply that the potential number of users is the same for all countries. Although this number could be calculated in the bases of the estimation results and the actual data, this would lead to highly unreliable numbers given the short time period in consideration and the low level of Internet penetration in low and, to some extent, medium income countries.[5]

Analysing the results as listed in

[5] See e.g. Stoneman (2002) for an elaboration on this and similar empirical issues.

Table 3 we find that in most countries the number of telephone mainlines per household is a positive and significant determinant of the potential number of internet users. This is not surprising since telephone lines is in many countries the main infrastructure for Internet connectivity. Of course telephone mainlines is also an indicator for communication infrastructures in general. Also the variables describing Institutional Quality such as Regulatory Quality and Government Efficiency are important factors. Income per capita is not an important factor for the number of internet users. This is in line with findings of e.q. Dasgupta et al. (2001). Note however that this does not mean that income does not matter. Here we analyze the growth rate of the number of internet users as a function of the number of internet users in the base year and additional factors such as income etc. Is it well possible, and also very likely, that the absolute number of internet users per household highly depends on income as we have seen in the overview in Table 2. A result that is somewhat more difficult to interpret is the negative sign of the consumption share of households in NNI. This can point in (at least) two directions: if the consumption share of households in NNI is lower, they save more and so investments are higher, which leads to more internet use. The other explanation can be that government investment is higher, e.g. investments in infrastructure, in legal and political structures, in education etc. which leads to higher internet use.

Table 3. Estimation results for the number of Internet users per household[6]

Log of Internet users per household in 2000 - Log of Internet users per household in 1996				
	All Countries	**Low income**	**Medium income**	**High income**
Log of:				
IUHH1996	-0.743 (0.053)***	-0.673 (0.102)***	-0.774 (0.069)***	-0.568 (0.040)***
Technology				
TMLHH1996	0.613 (0.091)***	0.705 (0.163)***	1.254 (0.191)***	
TVHH1996			-0.403 (0.155)**	
CELTMSHH1996			0.185 (0.074)**	
Institutional Quality				
RQ1996	1.690 (0.352)***	1.429 (0.457)***		2.239 (0.349)***
GE1996			2.697 (0.637)***	
Economic structure				
AGRSHR1996			0.583 (0.275)**	-0.604 (0.120)***
SERVSHR1996				2.086 (0.594)***
CONSSHR1996	-1.369 (0.407)***		-4.797 (1.807)**	-6.572 (1.536)***
GCONSHR1996				
FDINSHR1996		-0.365 (0.129)**		
GDPPCPP1996				-1.405 (0.337)***
EXSHR1996		1.136 (0.289)***	-0.930 (0.492)*	-1.887 (0.346)***
IMSHR1996	0.285 (0.126)**		0.967 (0.474)*	2.011 (0.316)***
Demographics				
POPRURSHR1996	-0.458 (0.189)**	-1.281 (0.409)***		
POPRUDESKM1996	-0.112 (0.057)*			-0.202 (0.025)***
POP65SHR1996		-1.814 (0.799)**	-0.537 (0.215)**	
POP14SHR1996	0.544 (0.284)*	5.052 (2.089)**		
(Constant)	3.306 (2.283)	-20.966 (8.912)	18.486 (7.838)	32.418 (8.398)
Adjusted R2	0.81	0.81	0.90	0.97
N	134	28	59	26

The demographic variables suggest that there is a negative relation between the share of population living in rural areas and the number of Internet users. Or to put it the other way around, internet use is higher in more urbanised countries. A high share of older people leads to less Internet use and a high share of youngsters leads to a higher potential penetration rates. These results are in line with our expectations.

To conclude we find that telecom infrastructure, the institutional quality and some demographic factors can explain the (potential) Internet use and that income is not important in this sense. This of course points into a policy conclusion of more investment in infrastructures and more or better regulation. Concerning infrastructure

[6] The variable names are explained in the appendix.

we find a positive relation between cellular phones and internet use in the medium income countries but this results is not clear from the overall analysis.

So far we have investigated the relation between technology, economic structure, institutional quality and demographic factors and the number of Internet users per household. A similar analysis can be used to investigate the relation between these factors, including internet use, and income growth.

Technology and income growth

As mentioned above the data do not allow for an analysis based on a more formal model such as used in growth accounting exercises or formal production function analysis. We therefore take a shortcut and explain the growth rate of GDP per capita by the level of GDP in the base year plus some structural variables as used above. This implies that we use a mixed methodology of convergence/divergence theory and theories on technological change.

Formally, we model the growth rate of GDP per capita as:

$$\mathrm{Ln}(Y_t/L_t) - \ln(Y_{t-1}/L_{t-1}) = \beta \ln(Y_{t-1}/L_{t-1}) + \sum_j \alpha_j . \ln x_{j,t-1} + \varepsilon_t \qquad (6)$$

where L denotes total population in a country and the x_j terms refer as before to various factors describing technology, institutional quality, economic structure, financial indicators and demographic characteristics.

We expect that higher penetration rates of new technologies have a positive impact on the growth rate of GDP per capita. Concerning convergence or divergence, if higher *growth rates* of GDP per capita are related to *lower level* of GDP per capita in the base year it is said that there is beta-convergence.

The equation above is estimated in a similar way as is done before and the results are listed in Table 4. The estimate for all countries taken together (N=109) is less robust compared to the individual income groups and less variables are significant. There is no evidence of convergence and the included technological variables do not show any significant impact on income growth. Higher income growth is however positive related with a higher share of the manufacturing sector in total GDP as well as a lower household consumption share in total GDP. The latter can be related to either a higher share of government consumption or a higher savings rates. Since government consumption is not significant, this points towards the importance of private saving for income growth.

Net foreign direct investment has a positive impact on income growth which points towards the importance of knowledge spillovers that accompany such investments. A higher age dependency ratio (dependents to the working-age population) is related with a lower potential labour force and is expected to have a negative impact on the growth rate of GDP per capita. This is confirmed by the results. This is however contrasting the finding that the share of the population ages between 15 and 65 as percentage of total population (POP64SHR1996) has a negative sign. This result is somewhat surprising and no precise explanation can be given without further analysis.

Overall the results are in line with our expectations but technology in general and Internet use in particular does not have a significant impact on income growth per capita at this macro-level of analysis. Technology indicators show a mixed effect on income growth for the low income countries. The number of cell phones per household as well as the irrigated land as percentage of total cultivated land has a positive impact. However, the number of internet users has a negative impact. This also holds true for the high income countries where the penetration rates are much higher. For the medium income countries we find a positive effect of the number of Internet users. Moreover, for these countries we also find beta convergence, i.e. relative within this group low income countries are catching up to some extent. Note however that the standard deviation as listed in Table 1 is growing with 12% which is clearly more than the average such that there is no so-called sigma-convergence. The latter would imply that the differences within this group would reduce, which is not the case.

Concerning Institutional Quality the Governments Efficiency is positive for the low income countries. This finding is in line with general finding in the political economy strand of literature; see e.g. Garrett (1998). In this literature, one normally finds positive effects of democracy and Institutional Quality for low income countries, a neutral effect for medium income countries and often a negative effect for the high-income countries. We do not find the latter in our analysis but the effects of Institutional Quality on income growth in low and medium income countries is confirmed here.

The effects of those variables that describe the economic structure in the analysis are in general as expected. In low income countries the service sector is not the driving sector and in the medium and high income countries the size of the service sector and the manufacturing sector has a positive impact on income growth. Trade in general has a positive effect on growth but surprisingly it is a high import share that is positively related to income growth and not exports. This could indicate the importance of knowledge spillovers arising from imports but more detailed data are needed to confirm this hypothesis.

Financial aid has a positive impact on income growth in low income countries and the same holds true for net FDI inflow in medium income countries. Finally, the relation between demographic indicators and income growth are within the income groups similar to those for all countries taken together. A minor difference is that population density has a positive impact in low income countries which is not found for the other groups.

Table 4. Growth rate of GDP per Capita

ln(gdppc2002)-ln(gdppc1996)				
	All Countries	Low Income	Medium Income	High Income
GDPPCPP1996			-0.202 (0.063)***	
Technology				
CELTMSHH1996		0.054 (0.025)*		
IUHH1996		-0.035 (0.017)*	0.030 (0.018)*	-0.042 (0.021)*
TMLHH1996			0.081 (0.036)**	
IRLAND1996		0.057 (0.012)***		
Institutional Quality				
RQ1996		0.399 (0.125)***		
Economic Structure				
MANSHR1996	0.057 (0.021)***			0.140 (0.055)**
SERVSHR1996		-0.271 (0.101)**	0.255 (0.110)**	
EXSHR1996		-0.443 (0.152)**		-0.408 (0.160)**
IMSHR1996		0.591 (0.194)***		0.527 (0.161)***
CONSSHR1996	-0.312 (0.104)***	-1.212 (0.557)**		-0.914 (0.322)**
GCONSHR1996				
Financial factors				
AIFSHR1996		0.091 (0.036)**		
FDINSHR1996	0.047 (0.017)***		0.049 (0.027)*	
Demographics				
AGEDEPSHR1996	-1.196 (0.253)***		-1.390 (0.326)***	0.482 (0.260)*
POPDESKM1996		0.059 (0.029)*		
POP64SHR1996	-1.965 (0.630)***		-2.076 (0.878)**	-0.024 (0.013)*
(Constant)	6.112 (2.418)**	5.641 (2.211)**	8.584 (3.629)**	3.675 (1.562)**
Adjusted R2	0.379	0.657	0.498	0.537
N	109	30	52	25

Conclusions

In this short explorative study we investigated the determinants of the number of Internet users per household in as many countries as possible. This goal of having a worldwide coverage is clearly at the cost of detail of analysis since data for a more detailed analysis, and certainly for a more dynamic and simultaneous system of analysis are missing for many countries. In our explanation of the growth rate of Internet users per household we clearly find that institutional quality is of great importance. In most cases the index on Regulatory Quality has a highly significant and positive effect on internet use. Also the number of main telephone lines per household is significant and positive. Per capita income is not a significant determinant of the growth rate of internet users. This does not imply that income does not matter. The internet penetration rate is much higher in high income countries so that these countries are positioned at a higher end in the diffusion curve. It is well known that adoptions rates are dropping at higher levels of penetration.

Relating technological factors to income growth shows mixed results. The number of Internet users per household is positive and significant for medium income countries but negative and significant for low and high income countries. In low income countries other technologies such as the number of cell phones and the percentage of irrigated land is much more important. Given the timeframe of our analysis which covers the period between 1996 and 2002, and the low penetration rates in low income countries, it is may be too early to give a more conclusive answer. Some authors, e.g. Khalil (2004), show that Wireless Internet can become more and more important in less developed countries but these technologies were in an infant stage in the period that is covered by our analysis. The general conclusion that other technologies such as the percentage of irrigated land have a stronger impact on income growth in less developed countries remains. Internet use only becomes visible at higher levels of development, at least in a macro cross-country setting as applied here.

Obviously these conclusions demand for further and more detailed analysis. The dynamics of technological change and its consequences for economic growth and income growth are more complex than described in this paper. Especially the relation between technology and income growth should be analysed in more detail, including interactions of technology with R&D and human capital. This however demands for better and more detailed data if a global coverage remains our goal.

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Appendix A Data description

Despite the large number of countries covered by the databases of the World Bank, UN and ITU we could make only a limited selection of variables.
The focus of the study is on five spheres of society: Institutional quality (IQ), Technology (TE), Economic structure (ES), Financial flows (FI) and finally Demographics (DE). We aim is to cover as many as possible countries and this severely restricts the choice of variables (only when the coverage of variables within these three categories was large enough- that is to say when more that 150 counties were covered) a variable was included in the selection. These criteria led to the current dataset, which consists of XX variables covering approximately 90 countries.

Institutional quality

- Voice and accountability (VA)
- Political stability and absence of violence (PS)
- Government effectiveness (GF)
- Regulatory quality (RQ)
- Rule of law (RL)
- Control of corruption (CC)

Technology

- Radios per household (RADIOHH)
- Main telephone lines in operation per household (TMLHH)
- Cellular mobile telephone subscribers per household (CELTMSHH)
- International ingoing telephone traffic (minutes) per household (INTTELEINTRHH)
- International outgoing telephone traffic (minutes) per household (INTTELEOUTTRHH)
- Internet users per household (IUHH)
- TV's per household (TVHH)
- Agricultural machinery, tractors per 100 hectares of arable land (AMPHA)
- Irrigated land (IRLAND)

Economic structure

- Agriculture, share of value added in GDP (AGRSHR)
- Manufacturing, share of value added in GDP (MANSHR)
- Services, etc., share of value added in GDP value added (SERVSHR)
- Exports of goods and services share of value added in GDP (EXSHR)
- Imports of goods and services share of value added in GDP (IMSHR)
- Household final consumption expenditure as percentage of GDP (CONSSHR)
- Government final consumption expenditure as percentage of GDP (GCONSSHR)
- Foreign direct investment, net inflows as % of GDP (FDINSHR)

- Current account balance as % of GDP (CABSGDP)
- Gross fixed capital formation as % of GDP (GFCFSGDP)

Financial flows

- Money and quasi money as % of GDP (M2SHR)
- Foreign Aid as % of GNI (AIFSHR)
- Net foreign assets (current LCU) as share of GDP (current LCU) (NFAPGD)
- Domestic credit provided by banking sector as % of GDP (DCREDBA)

Demographics

- Age dependency ratio in % of working-age population (AGEDEPSHR)
- Labour force military in % of total labour force (LFMILSHR)
- Labour force children age 10-14 in % of age group (LF1014RAT)
- Urban population in of total population (POPURBSH)
- Rural population in % of total population (POPRUSHR)
- Rural population density in people per square km (POPRUDESKM)
- Population density in people per square km (POPDESKM)
- Labour force females in % of labour force (LFFSHR)
- Female population in % of total population (POPFSHR)
- Population 0-14, in % of total population (POP14SHR)
- Population 15-64, in % of total population (POP64SHR)
- Population above 65-, in % of total population (POP65SHR)

Income

- GDP per capita, PPP (constant 1995 international $)-- (GDPPCPP)

Countries included in the data set

Countries are ranked according to the level of per capita income in 1996. As mentioned above, the thresholds are in accordance with the classification of the World Bank. Low income countries have a per capita income of less than 2000 International $, medium income countries are those with an income between 2000 and 12000 International $ and high income countries are those with an income above 12000 International $.

Low Income countries are (GDP per capita in constant 1995 International Dollars of less than 2000, in order of income)

Tanzania, Malawi, Ethiopia, Burundi, Sierra Leone, Mozambique, Tajikistan, Mali, Yemen, Rep., Niger, Zambia, Madagascar, Chad, Nigeria, Congo, Benin, Eritrea, Burkina Faso, Guinea-Bissau, Rwanda, Kenya, Central African Republic, Uganda, Nepal, Congo, Dem. Rep., Kyrgyz Republic, Lao PDR, Uzbekistan, Senegal, Sudan,

Bangladesh, Moldova, Mongolia, Cambodia, Gambia, The, Togo, Cote d'Ivoire, Georgia, Haiti, Vietnam, Mauritania, Comoros, Cameroon, Ghana, Angola, Guinea, Azerbaijan, Pakistan, Armenia, Lesotho, Djibouti, India

Medium Income countries are (GDP per capita in constant 1995 International Dollars of more than 2000 but less than 12000, in order of income)

Bolivia, Nicaragua, Equatorial Guinea, Solomon Islands, Honduras, Papua New Guinea, Zimbabwe, Turkmenistan, China, Sri Lanka, Albania, Egypt, Arab Rep., Indonesia, Syrian Arab Republic, Ecuador, Vanuatu, Morocco, Belarus, Kazakhstan, Jamaica, Guatemala, Philippines, Ukraine, Guyana, Cape Verde, Jordan, Swaziland, Lebanon, El Salvador, Peru, Samoa, Saint Vincent and the Grenadines, Paraguay, Dominican Republic, Belize, Fiji, Algeria, Dominica, Panama, Tunisia, Iran, Islamic Rep., Saint Lucia, Namibia, Tonga, Grenada, Latvia, Bulgaria, Macedonia, FYR, Turkey, Venezuela, RB, Russian Federation, Botswana, Colombia, Romania, Gabon, Thailand, Brazil, Lithuania, Costa Rica, Trinidad and Tobago, Mexico, Estonia, Croatia, Poland, Mauritius, Malaysia, Chile, Uruguay, Antigua and Barbuda, South Africa, Slovak Republic, Hungary, Saint Kitts and Nevis, Argentina, Oman, Saudi Arabia

High Income countries (GDP per capita in constant 1995 International Dollars of 12000 and above, in order of income)

Korea, Rep., Barbados, Czech Republic, Slovenia, Greece, Bahrain, Cyprus, Portugal, Malta, Bahamas, The, Kuwait, Spain, Israel, New Zealand, Puerto Rico, Ireland, Singapore, Finland, United Arab Emirates, Sweden, United Kingdom, France, Italy, Belgium, Australia, China, Hong Kong, Netherlands, Germany, Canada, Iceland, Austria, Japan, Denmark, Switzerland, United States, Norway, Luxembourg

Not included are (listed alphabetically, classification according to the World Bank)

Andorra (High), Bermuda (High), Bosnia and Herzegovina (Medium), Brunei (High), Cayman Islands (High), Cuba (Medium), French Polynesia (High), Iraq (Medium), Kiribati (Medium), Korea, Dem Rep. (Low), Liberia (Low), Libya (Medium), Liechtenstein (High), Maldives (Medium), Marshall Islands (Medium), Micronesia Fed. Sts. (Medium), Myanmar (Low), New Caledonia (High), Palau (Medium), Qatar (High), San Marino (High), Sao Tome and Principe (Low), Seychelles (Medium), Somalia (Low), Suriname (Medium)