Growth and Convergence of Residential Water Consumption

Guillermo Acuña, Cristián Echeverría and Alex Godoy
Universidad del Desarrollo

Abstract

We find β-convergence in per household consumption across Chilean localities, given that low consumption localities tend to increase their consumption faster than high consumption localities. We also find evidence of σ-convergence, since the per household consumption distribution is becoming less unequal. However, the convergence is heading towards a greater level of consumption, which is undesirable from the point of view of sustainable development. We estimate a water demand function, finding that the main reason of convergence appears to be the increase in income of poor localities, which have enabled them to consume more water.

Keywords: residential water consumption, convergence.

1. Introduction

Water supply is an important issue for sustainable development, given the rapid increase of consumption for residential and non-residential uses, and the effects of the extended drought affecting the central zone of Chile. Climate change is also being an issue, since it is reducing rainfall and increasing temperatures in the most populated regions of the country, factors that should increase water demand.

Regarding residential water consumption, even though some analysis appears to show that the per household consumption is decreasing, we show that per household consumption across localities is growing and converging to a long run level that is higher than the current level. Therefore, we should expect an increase in the growth rate of total water consumption during the following century, making the water availability an urgent problem.

We also find that the most important factor explaining per household consumption growth is the increase in the income of poor localities, enabling them to consume more water. On the other hand, even though water demand is inelastic to prices, the growth in prices have been the most important factor moderating the raise of per household consumption.

For our demonstrations we use descriptive statistics as well as an econometric analysis of panel water consumption data. The database is a monthly panel of water consumption for 530 Chilean localities from January 2010 to December 2015, collected from the corresponding regulatory agency and complemented with socio-economic and climatic data from others sources.

We structure the reminder of the paper as follows. In Section 2 we review the literature on convergence and residential water demand. In section 3 we describe the data. In Section 4 we analyzed convergence of water consumption. In Section 5 we analyze a water demand function and the possible causes of convergence. Finally, in Section 6 we summarize the main conclusions.

2. Literature review

Economic convergence is a relevant concept in the field of economic growth, where there is the hypothesis that various economies showing different levels of income will converge (or diverge) in the long run to similar levels of income. This hypothesis is supported by the fact that the less developed economies tend to show larger growth rates than the most developed economies.

According to Sala-i-Martin (1996), two types of convergence are analyzed. There is β-*convergence* in a cross-section of economies when we find a negative relation between the growth rate of per capita income and the initial level of income, that is, if poor economies tend to grow faster than wealthy ones. On the other hand, there is σ-*convergence* when the dispersion of per capita income across economies tends to decrease over time. In other words, while σ-convergence studies how the distribution of income evolves over time, β-convergence studies the mobility of income within the same distribution.

Sala-i-martin (1996) finds empirical evidence of regional income convergence across the United States, Japan and five European nations. He also finds that the estimated speeds of convergence were surprisingly similar across data sets and that the distribution of income in all countries has shrunk over time.

These concepts can also be studied in the field of water demand, in which there would be β-convergence if localities with low per capita water consumption tend to increase their consumption faster than localities with high per capita consumption. There would be σ-convergence if the distribution of per capita water consumption decreases its dispersion over time, that is, if the water consumption inequality decreases over time.

Portnov & Meir (2007) find β-convergence of residential water consumption in Israel, since per capita water consumption in low level consumption localities tends to grow faster than in localities with high per capita water consumption. The observed convergence trend stems from two main factors: (1) the saturation of water consumption in wealthy localities, and (2) the rising standards of living in poor localities, enabling them to consume more water for household use.

On the other hand, the literature of residential water demand focuses mainly in water prices, since prices are considered the chief instrument to control demand. From that perspective, an econometric model of the form $Q_d = f(P, Z)$ is typically used, which relates water consumption with some measure of price (P) and other factors (Z) such as income, household and dwelling characteristics, and climate variables. Most of the researchers have used aggregate data, given the lack of proper information at the household level, and even though the estimation of a water demand function with micro data at the household level would be the ideal approach. We next describe some results of related studies.

Höglund (1999) estimates a household demand function using a panel of aggregated level data of Sweden, finding a long-run price elasticity of -0.10 in marginal price models and -0.20 in average price models, while the income elasticity was estimated to be between 0.07 and 0.13. Martínez-Espiñeira (2002) uses a panel of monthly aggregate data of Spain to estimate a residential water demand function. He finds that price elasticity lies between -0.12 and -0.16 and income elasticities between 0.40 and 0.71. He also finds that both elasticities are higher during summer months. Mazzanti & Montini (2006) use municipal panel data from Italy to estimate a residential water demand function. They find a price elasticity between -0.99 and -1.33, and an income elasticity between 0.40 and 0.71.

Fercovic, Foster & Melo (2015) estimate a residential demand function at the municipal level in Chile using panel data for the period 1998-2010, finding a price elasticity of -0.14 and an income elasticity of 0.20 They also find a significant effect of temperature over water consumption, and projected a small increase (about 1% greater) in per household consumption toward the end of the century (because of climate change).

3. Data

The database is a monthly panel of 530 Chilean localities from January 2010 to December 2015 (72 months). Consumption and water prices data are collected from the regulatory agency SISS (*Superintendencia de Servicios Sanitarios*). The consumption data is complemented with socioeconomic and demographic data from the CASEN survey, a national household survey, available for 2009, 2011 and 2013. These annual data are turned into monthly frequency using interpolation and extrapolation. We also add climate data from the DMC (*Dirección Meteorológica de Chile*) and DGA (*Dirección General de Aguas*), assembled by the Center of Cllimate Science and Resilience (CR2).

Per household consumption is calculated by dividing total consumption by the total number of households in each locality. Therefore, we have a measure that can be interpreted as the per household water consumption of a representative household of the locality. If we then average per household consumption across localities, to obtain only one average measure per date, we observe that per household consumption is growing over time[1], as we show in Figure 1.

[Figure 1 about here]

Figure 2 is revealing, since we can appreciate the distribution of per household consumption per year. The consumption of localities with a high level of initial consumption appears to be stable over time, while the consumption of localities with a low level of initial consumption is increasing. Also, the dispersion of per household consumption distribution is decreasing over time, that is, the per household consumption distribution is becoming less unequal. Therefore, we have some initial evidence of both β-convergence and σ-convergence.

[Figure 2 about here]

4. Empirical results

There is β-convergence in per household consumption when we find a negative relation between the growth rate and the initial level of per household consumption across localities, that is, if low consumption localities tend to increase their consumption faster than high consumption localities. We find a strong negative correlation (-0.72) between the average growth rate and the initial level of income, which is showed in the scatter plot of Figure 3. The higher the initial level of consumption, the more negative is consumption growth rate, and those localities with the least initial level of income shows positive growth rate. The 36% of the localities shows a positive average growth rate between January 2010 and December 2015, while the remaining localities show a negative average growth.

[Figure 3 about here]

[1] If we first sum total consumption and the total number of households in the country, and then calculate the average per household consumption, we would observe the opposite pattern: per household consumption is decreasing over time. The fact is explained because that calculation reflects the dynamics of the households with greater weight in total consumption, that are the households that consume more water.

We can estimate the speed of convergence β by regressing the average growth rate of a set of localities between times t_0 and $t_0 + T$ on the initial level of income, using the following nonlinear equation[2]:

$$\frac{1}{T}\log\left(\frac{y_{it_0+T}}{y_{it_0}}\right) = \alpha - \left(\frac{1 - e^{-\beta T}}{T}\right)\log\left(y_{it_0}\right) + u_{it_0+T}$$

If β is positive, then we have evidence of β-convergence. For estimation we considered only the localities for which we had the whole 6 years of observations (72 months)[3], and we worked with the monthly growth rate. The dependent variable is the average growth rate of per household consumption. Per household consumption is the total water consumption in a locality divided by the number of households, so this measure can be interpreted as the per household water consumption of a representative household of the locality.

Table 1 shows the results of the estimation using non-linear OLS. The estimated β is positive, so there is absolute convergence, and equal to a monthly 0.4% (the per household consumption growth rate decreases in a monthly rate of 0.4%). In other words, there is a negative relationship between growth rate and initial level of income, as localities with smaller initial levels of consumption tends to grow faster localities of high initial level of consumption.

[Table 1 about here]

Regarding σ-convergence, the Table 2 shows the evolution of the distribution of annual per household consumption (ln) across localities. The mean of per household consumption is increasing over time, while its dispersion (standard deviation) has decreased, that is, there is σ-convergence, the per household consumption distribution is less unequal. However, the convergence is heading towards a higher level of consumption, which is undesirable from the point of view of sustainable development.

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[2] See Barro & Sala-i-Martin (1990) to know the derivation of the equation.

[3] We worked with 6 years of observations for a total of 269 localities, while Fercovic et al. (2013) had 13 years of observations for 42 localities.

[Table 2 about here]

In Figure 4 we clearly see how the dispersion of per household consumption is monotonically decreasing over time, while in Figure 5 we show a comparison between simulated distributions (on the basis of the parameters of Table 2) of per household consumption in 2010 and 2015. The per household consumption distribution of 2015 has a smaller dispersion and a larger mean than the distribution of 2010.

[Figure 4 about here]

[Figure 5 about here]

5. Estimation of a residential water demand function

We estimate a water demand equation to analyze which variables can mainly explain the convergence of per household consumption over time. For robustness of the results, we estimate three models of the form $Q_d = f(P, Z)$, which relates water consumption to price (P) and other factors (Z) such as income, household and dwelling characteristics, and climate variables. These equations depend on different assumptions for both, the coefficients and standard error estimations.

First, we use a pooled OLS estimator, which treat as equals the within and between variation of the data. For inference we estimate clustered robust errors by locality.

$$y_{it} = \alpha + X'_{it}\beta + u_{it}$$

Second, we use the between estimator, since for the most of the variables there is more between variation than within variation, so this estimator should be the best. For inference we estimate OLS standard errors.

$$\bar{y}_i = \alpha + \bar{X}'_i\beta + (\alpha_i - \alpha + \bar{u}_i)$$

Finally, we use the fixed-effect model with the within estimator, since it allows controlling for unobserved heterogeneity invariant over time. For example, the regressors could be correlated with idiosyncratic characteristics of localities, and in such situation the estimates of the first two models would be biased. For inference we model the errors as an autoregressive process of first order, AR(1), given that we have a great amount of time periods, with serially correlated variables.

$$y_{it} = \alpha_i + X_{it}'\beta + u_{it}$$

$$u_{it} = \rho u_{it-1} + \varepsilon_{it}$$

The dependent variable is the *per household consumption* by locality, obtained by dividing total consumption of a locality by the total number of households. We used the logarithm of per household consumption to estimate elasticities or semi-elasticites, and for dealing with the influence of extreme values of per household consumption distribution.

As price measure we use the *average price of water*, since there is evidence that consumers do not devote much time of effort to study the structure of changes in intramarginal rates (Billings & Agthe, 1980; Bacharach & Vaughan, 1994) because of information costs, so they use the average price to decide how much water to consume. The average price is calculated by summing the spending of the first and second block, plus the fixed rate, and then dividing the sum by total consumption (so we obtained the average price in monetary units per m^3). We use the logarithm of average price to estimate the price elasticity of demand.

It should be noted that when there are block prices, prices are endogenously determined by the quantity demanded, therefore there is a simultaneous-equations problem. However, we consider the simultaneity problem as not relevant in our case, since only the 2% of the observations are associated with consumption in the second block of prices. We repeated the estimations dropping those observations, and we obtained similar results.

As measure of income we use the logarithm of *per capita income* (average by locality), to estimate the income elasticity of demand. In this case using logarithms can also help to reduce the influence of extreme values in income distribution.

For controlling for *household characteristics*, we use the number of people in the household (average by locality), since more numerous households should consume more water. We also use the number of people in the household below 15 years old, since households with more children should also consume more water, because a higher frequency of clothing washing. These variables are used in levels.

We also control by differences in *dwellings characteristics*, since consumption should be higher the larger the dwelling. We use two measures: number of bedrooms and number of bathrooms in the dwelling. These variables could be correlated with income, since it is expected that wealthier households have larger dwellings, but this is not always the case, because there are households in the same level of income but having dwellings of different size (there is a higher correlation between income and number of bathrooms than with the number of bedrooms). These variables are used in levels.

Climate variables also drive water consumption, since consumption should be higher in warm and dry localities. These relationships can be observed in the seasonal dynamic of water demand, as consumption increases in summer months. We use monthly accumulated rainfall and monthly average temperature by locality as climate measures. We also use an interaction term between both variables, since rainfall effect depends on the level of temperature: in warm and wet localities consumption is higher than in cold and wet localities, and the analogue relationship is valid for dry localities. These variable are used in levels.

Besides, we use monthly dummies to model the fraction of variance that depends on seasonal factors, and that is not captured by climate variables. For example, summer consumption is higher because weather, but also because children and youngsters spend more time in the dwelling, since they are in holidays.

[Table 3 about here]

Table 3 shows the results of the estimations. In all of the cases the price elasticity of demand is inelastic (less than 1), which means that percentage changes in prices produce smaller percentage changes in quantity demanded. An increase of 1% in price reduces water consumption between -0.03% and -0.48%. The smaller value estimated when using fixed-effects (FE) is explained because the within variation (variation over time) is smaller than the between variation (variation across localities), so this coefficient is underestimated, since the within estimator maximizes the within fit of the model. These values for price elasticity are similar to those found by other authors[4].

The income elasticity of demand is positive and inelastic, as it was expected, since the spending in water is only a small proportion of the household total income. An increase of 1% in income increases water consumption between 0.18% and 0.34%.

The number of people in the household is positively related with per household consumption of water. An increase of 1 person in the household increases water consumption between 4% and 33%. The number of people aged below 15 is negatively related with water consumption in the estimates from OLS and BE, which could be explained by an endogeneity bias, that would be corrected in the FE estimates. However, when using the FE model the coefficient is not significant, which could be explained by the high correlation between the total number of people in the household, and the number of people aged below 15. A Wald test of joint significance, which is more robust to multicollinearity, reveals that both variables are jointly significant.

The variables characterizing dwellings are only significant in the OLS estimates, and the signs are those we expected. The larger the dwelling the larger the average water consumption.

[4] See Arbúes et al. (2003).

The results for climate variables are mixed. In the OLS equation only the average temperature coefficient is significant: the higher the average temperature the larger the average water consumption. In the BE equation the accumulated rainfall coefficient is significant: the higher the amount of accumulated rainfall the smaller the average water consumption, and also the interaction term with the temperature: independently of the amount of rainfall, the higher the temperature the larger the average water consumption. All of the three coefficients, rainfall, temperature and the interaction term, were jointly significant. Finally, in the FE model all the variables are significant, and the signs are positive, which is an unexpected result in the case of accumulated rainfall, that can be explained because the within variation of rainfall is smaller than the between variation (in wet localities there is rainfall all year round, while the temperature variation over seasons is higher), leading to an inconsistent estimation of the coefficient.

The coefficients of the monthly dummies are excluded from the table; tough it is mentioned that they are all significant.

To analyze which variables have been the most important to explain the dynamics of per capita consumption, we perform an additional regression with standardized variables, since in this way we eliminate the influence of the measurement units of each variable over the coefficient magnitude. The standardized coefficients refer to how many standard deviations the dependent variable will change per one standard deviation increase in the regressor, so we can directly compare the magnitude of the coefficients and answer the question of which of the regressors have the greater effect on the per household water consumption variation. We estimate the OLS model, since it is the less sensitive estimator to the standardization method (using pooled data), and it also achieve the best fit among the alternative models.

The results are showed in Table 4. The variables with greater effect in magnitude are: average price, number of people in the household, number of bathrooms of the dwelling, average temperature and per capita income.

[Table 4 about here]

It is noteworthy that, even though price elasticity is low, the increase in prices has been the main factor explaining per household consumption variation, specifically, the increase in prices has been moderating per household consumption growth. In the second place is the number of people in the household, which has decreased over time, so it has also contributed to moderate the per household consumption growth.

On the other hand, the number of bathrooms of the dwelling, average temperature and per capita income have been the main factors explaining per household consumption increase. The number of bathrooms and per capita income are indicators of economic development, while the increase in average temperature could be attributed to global warming.

Per household consumption depends on two types of forces, one of them decreasing per household consumption and the other decreasing it. Among the factors decreasing per household consumption during the period, the increase in prices has been the most important, since they have shown a large increase during the period. The decrease in the number of people in the household has also contributed, but its effect will no longer be a factor, since this variable cannot decrease permanently. Indeed, it appears to be converging to a long run level. On the other hand, among the factors increasing consumption growth rate, income related factors have been the most important.

Finally, we analyze the variables growth rate by per capita income cluster[5] (Table 5), since income related factors are the main factors explaining increases in consumption. First, we find that in wealthy localities (cluster 3) has been a decrease in per household consumption, while in poor localities (cluster 1) we find the larger increase in consumption. Second, we find that in wealthy localities (cluster 3) has been a larger increase in average price, a larger decrease in the number of people in the household, and a larger decrease in average temperatures, factors contributing to reduce consumption, while in poor localities (cluster 1) has been a larger increase in per capita income and number of bathrooms, factors contributing to increase consumption. Therefore, income related dynamics appears to be main factor

[5] We build the clusters using k-means clustering.

explaining convergence on per household consumption, as noted before by Portnov & Meir (2007).

[Table 5 about here]

6. Conclusions

We find evidence of absolute β-convergence in per household water consumption, given that there is a negative relationship between growth rate and the initial level of income, which means that localities with small initial levels of consumption tends to grow faster than localities of higher initial level of consumption. We also find evidence of σ-convergence, which means that the dispersion of per household consumption distribution is decreasing over time, so the per household consumption distribution has been becoming less unequal. However, the convergence is heading towards a higher level of consumption, which is undesirable from the point of view of sustainable development.

This evidence justifies the implementation of programs supporting efficient consumption at a household level, with the aim of moderating the increase in per household consumption over time (as a climate change adaptation measure). It should be noted that it is desirable to have σ-convergence to achieve social justice, but the convergence should be to a smaller level of consumption. Therefore, programs promoting efficient consumption must be focused in households with high levels of consumption.

The increase in prices and the decrease in the number of people of the household have been the main factors contributing to reduce the growth rate of per household consumption, while among the variables increasing the growth rate, per capita income has been the most important. We also find that the main reason of convergence appears to be the increase in income of poor localities, which have enabled them to consume more water.

7. References

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Figures and tables

Figure 1. Per household consumption (ln(m3)) over time.

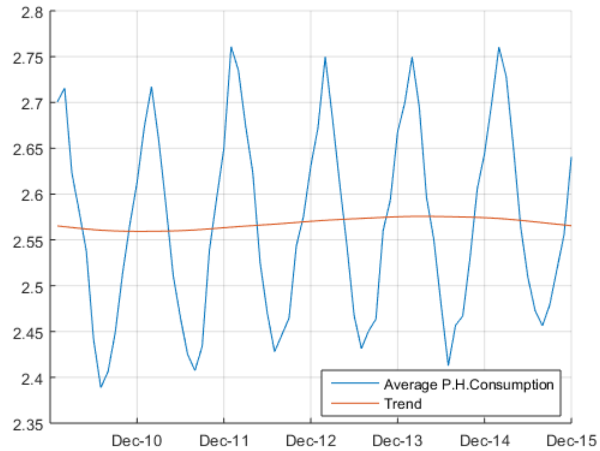

Figure 2. Box plot: per household consumption (ln(m3)) per year

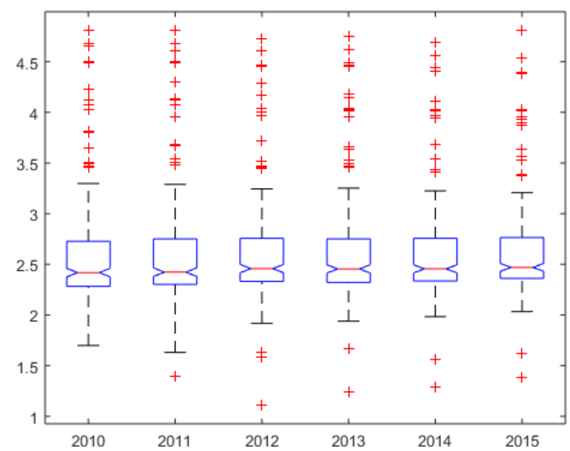

Figure 3. Scatter plot: Average growth rate (%) vs Initial per household consumption (ln(m3))

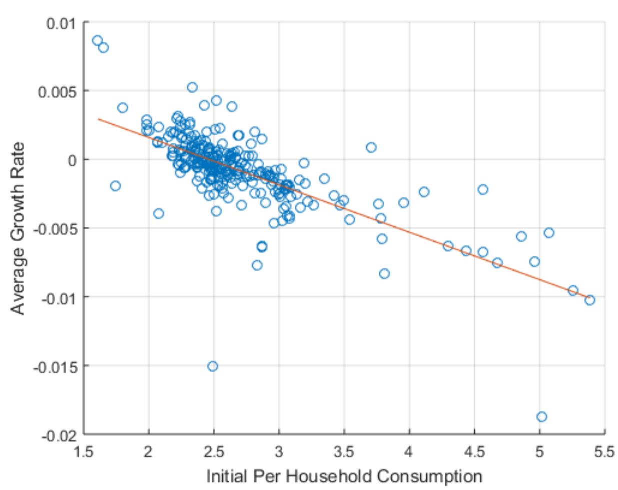

Figure 4. Dispersion of per household consumption (standard deviation) over time

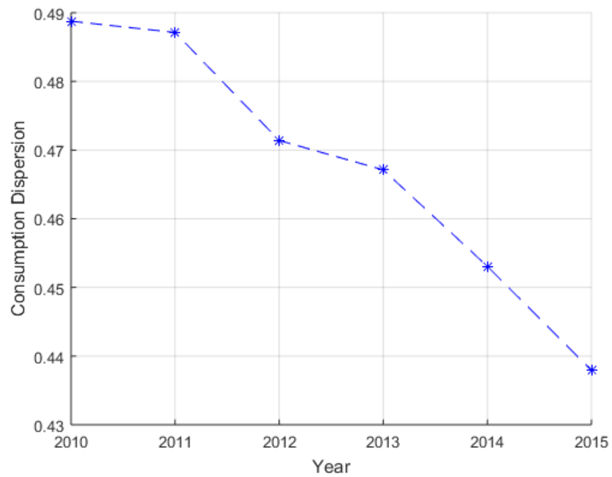

Figure 5. Per household consumption distribution: 2010 vs 2015

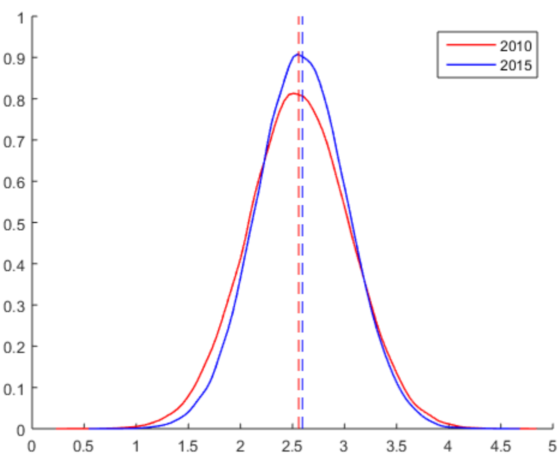

Table 1. Growth equation

The table shows the parameter estimates of the following model:

$$\frac{1}{T}\log\left(\frac{y_{it_0+T}}{y_{it_0}}\right) = \alpha - \left(\frac{1-e^{-\beta T}}{T}\right)\log\left(y_{it_0}\right) + u_{it_0+T}$$

where the dependent variable is the average monthly growth rate of per household consumption between January 2010 and December 2015. The independent variable is the initial level of income of each locality, that is, the average per household consumption of each locality at January 2010. The coefficients were estimated using non-linear OLS. P-values are given in parenthesis below the coefficient estimates, * p < 0.10, ** p > 0.05, *** p < 0.01

Constant (alfa)	0.0085***
	(0.0000)
Initial consumption (beta)	0.0040***
	(0.0000)
N	269
R2	0.5186

Table 2. Mean and Dispersion of per household consumption

The table shows the evolution of the per household consumption (ln) distribution, characterized by its mean and standard deviation.

Year	Mean	Std. Dev.
2010	2.5589	0.4888
2011	2.5651	0.4871
2012	2.5833	0.4714
2013	2.5840	0.4671
2014	2.5837	0.4531
2015	2.5944	0.4379

Table 3. Water demand estimations

The table shows the estimates of a water demand equation. The column OLS shows the OLS estimates of a model of the form $y_{it} = \alpha + X_{it}'\beta + u_{it}$, and clustered robust errors by locality. The column BE shows the OLS estimates of a model of the form $\bar{y}_{it} = \alpha + \bar{X}'\beta + u_{it}$, that is, the between estimator, and OLS standard errors. The column FE shows the estimates of a fixed-effects model of the form $y_{it} = \alpha_i + X_{it}'\beta + u_{it}$, using the within estimator, and AR(1) errors of the form $u_{it} = \rho u_{it-1} + \varepsilon_{it}$. The dependent variable is the ln() of the per household consumption by locality. The independents variables are: Average Price, the ln() of the average price of water; PC income, the ln() of the average income per locality; N People, the number of people in the household (average by locality); People below 15, the number of people in the household aged below 15 (average by locality); N Bedrooms, the number of bedrooms in the dwelling (average by locality); N Bathrooms, the number of bathrooms in the dwelling (average by locality); Acc. Rainfall, the monthly accumulated rainfall; Av. Temperat., the monthly average temperature; Rainfall*Tempet, an interaction term between Acc. Rainfall and Av. Tempet; Monthly Dummies are also used as independent variables but the coefficients are omitted from the table. P-values are given in parenthesis below the coefficient estimates, * $p < 0.10$, ** $p > 0.05$, *** $p < 0.01$

	OLS	BE	FE
Average Price	-0.3296***	-0.4792***	-0.0321***
	(0.0000)	(0.0000)	(0.0000)
PC Income	0.1751***	0.3444***	0.1999***
	(0.0020)	(0.0010)	(0.0000)
N People	0.2869***	0.3281***	0.0426***
	(0.0020)	(0.0100)	(0.0030)
People below 15	-0.3290**	-0.4881**	0.0436
	(0.0140)	(0.0380)	(0.1070)
N Bedrooms	0.1175***	0.1573	0.0163
	(0.0080)	(0.1800)	(0.2040)
N Bathrooms	0.3166***	0.1322	0.0354
	(0.0010)	(0.3570)	(0.1550)
Acc. Rainfall	0.0002	-0.0065**	0.0002***
	(0.1570)	(0.0500)	(0.0000)
Av. Temperat	0.0210***	0.0013	0.0040***
	(0.0000)	(0.9340)	(0.0000)
Rainfall*Tempet	0.0000	0.0006*	0.0000***
	(0.1350)	(0.0840)	(0.0000)
Constant	0.7712	0.3628	-0.0354***
	(0.3570)	(0.7840)	(0.0090)
N	21,230	21,230	20,792
R2	0.4013	0.0261	0.2385
R2-within		0.0003	0.4001
R2-between		0.4253	0.3037

Table 4. OLS regression with standardized variables

The table shows the estimates of a water demand equation with standardized variables. The model is one of the form $y_{it} = \alpha + X'_{it}\beta + u_{it}$, and clustered robust errors by locality. The dependent variable is the ln() of the per household consumption by locality. The independents variables are: Average Price, the ln() of the average price of water; PC income, the ln() of the average income per locality; N People, the number of people in the household (average by locality); People below 15, the number of people in the household aged below 15 (average by locality); N Bedrooms, the number of bedrooms in the dwelling (average by locality); N Bathrooms, the number of bathrooms in the dwelling (average by locality); Acc. Rainfall, the monthly accumulated rainfall; Av. Temperat., the monthly average temperature; Rainfall*Tempet, an interaction term between Acc. Rainfall and Av. Tempet; Monthly Dummies are also used as independent variables but the coefficients are omitted from the table. P-values are given in parenthesis below the coefficient estimates, * p < 0.10, ** p > 0.05, *** p < 0.01

	OLS
Average Price	-0.3195***
	(0.0000)
PC Income	0.1448***
	(0.0020)
N People	0.1987***
	(0.0020)
People below 15	-0.1236**
	(0.0140)
N Bedrooms	0.0696***
	(0.0080)
N Bathrooms	0.1954***
	(0.0010)
Acc. Rainfall	0.0371
	(0.1570)
Av. Temperat	0.1852***
	(0.0000)
Rainfall*Tempet	-0.0408
	(0.1350)
Constant	-0.3496***
	(0.0000)
N	21,230
R2	0.4013

Table 5. Regressors: average annual growth rate

The table shows the average growth and the average growth by cluster of the following variables: Av. Consumption, per household consumption by locality; Average Price, the average price of water; PC income, the average income per locality; N People, the number of people in the household (average by locality); People below 15, the number of people in the household aged below 15 (average by locality); N Bedrooms, the number of bedrooms in the dwelling (average by locality); N Bathrooms, the number of bathrooms in the dwelling (average by locality); Acc. Rainfall, the monthly accumulated rainfall; Av. Temperat., the monthly average temperature. Clusters were built using k-means clustering. Cluster 1 groups low income localities; Cluster 2 groups medium income localities; Cluster 3 groups high income localities.

Variable	Mean	Cluster 1	Cluster 2	Cluster 3
Av. Consumption	0.6%	0.8%	0.2%	-1.9%
Average Price	3.9%	3.9%	3.6%	4.2%
PC Income	3.5%	3.6%	4.2%	-1.6%
N People	-1.5%	-1.4%	-1.4%	-2.8%
People below 15	-4.0%	-3.8%	-5.2%	-1.3%
N Bedrooms	0.7%	0.8%	0.3%	0.1%
N Bathrooms	0.5%	0.4%	0.9%	0.1%
Acc. Rainfall	-0.1%	-0.3%	1.7%	-5.8%
Av. Temperat	0.1%	0.0%	0.7%	-1.4%