

Aizenman, Joshua; Brooks, Eileen

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## Globalization and taste convergence: The cases of wine and beer

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Globalization and taste convergence: The cases of wine and beer<sup>\*</sup>

**Abstract**

This paper investigates changes in cultural consumption patterns for a low-concentration industry: wine and beer. Using data on 38 countries from 1963-2000, there is clear convergence in the consumption of wine relative to beer between 1963 and 2000. Convergence occurs even more quickly within groups of countries that have a higher degree of integration. A key prediction of international trade is confirmed in the data: greater trade integration weakens the association between production and consumption patterns -- although the relative consumption of wine can be explained well in 1963 by grape production and latitude, these variables are much less significant in 2000. Despite these “scientific” explanations for the consumption of wine, there is also a cultural angle to wine consumption. While the relative wine consumption of France and Germany is converging, several Latin American countries fail to converge. The patterns of convergence are consistent with dynamics of adjustment in an overlapping generation habit formation model.

Joshua Aizenman  
Department of Economics; E2  
UCSC  
Santa Cruz, CA 95064  
[jaizen@ucsc.edu](mailto:jaizen@ucsc.edu)

Eileen L. Brooks

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\* This paper was written when Eileen Brooks was unable to enjoy wine or beer. Her incredible intellectual curiosity and joy of life propelled her research till the end, despite numerous health setbacks. Her admirable resolve and perseverance should guide us all. She is missed by all her numerous friends.

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## “THE GERMAN BEER CRISIS -- With Brewery Closures, Germany Faces Brauereisterben

Germany and beer have long been synonymous. But that is changing. With Monday's closing of two large breweries, the crisis facing the industry appears to be deepening. An aging population is partly to blame. But beer, as it turns out, just isn't cool anymore.”

*by Charles Hawley; SPIEGEL ONLINE 2005, Feb. 4, 2005*

### **I. Introduction**

Some globalization naysayers have suggested that it causes the homogenization of cultures. Pointing to McDonalds restaurants and Hollywood movies, they suggest that it is impossible to compete against large sunk costs and potentially larger brand values. However, the majority of industries do not exhibit the economies of scale necessary for this alleged nemesis of globalization to arise. The low-concentration industries should illustrate the economist's case for globalization, including increased product varieties for the consumer and efficient resource allocation.

However, little attention has been paid to understanding the changes in cultural consumption patterns for low-concentration industries. These products and services constitute the majority of economic output, and it is therefore essential to analyze these industries to learn about the overall impact of economic integration upon consumption patterns.

Beer and wine provide a unique product-level case study for analyzing the effect of economic integration upon products from two industries that do not have large sunk costs or a few dominant brands.<sup>1</sup> The consumption of beer and wine are examined because their

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<sup>1</sup> While there is no unique concentration measure used in the literature, one simple gauge is the share of the top 4 suppliers. Comparing this concentration measure across various sectors in the US, the 1997 Economic Censuses report indicates that the top four firms controlled 82% in the Motion picture film exchanges; 75% in the Motion picture & video distribution, 52% in food service contractors (including fast food), and 7% Beer, wine, & liquor stores. Similar concentration ranking of these sectors hold for other supply categories [see <http://www.census.gov/epcd/www/concentration.html>].

consumption is often attributed to different countries and cultures. For example, tour books describe France as a destination for wine drinkers and Germany as a place for beer enthusiasts. Beer and wine are also similar products that act as substitutes. There are beer and wine shops, societies, websites, travel guides, and T-shirt stores. More pragmatically, beer and wine are useful for a study of tastes because the volumes consumed are easily measured.

In addition to an empirical study of international consumption patterns of beer and wine, this paper contains a theoretical model consistent with the empirical results. This model builds upon two foundations from the literature: the study of habit formation, and the study of culture and trade.

Habit formation has been used frequently in two different ways. The first deals with the possibility that individual's current preferences depend on past consumption patterns, as in Pollak (1970). The second involves "Keeping up with the Joneses" patterns of behavior. As was noted by Duesenberry (1949), keeping up with the Joneses implies that consumers are willing to sacrifice saving in order to protect their living standards, inducing downward rigidity in the adjustments of consumption to bad shocks. Variants of habit formation have been used frequently in macroeconomics and finance, but rarely in modeling micro patterns of consumption.<sup>2</sup> Our model applies a Pollak (1970) variant of habit formation, in an overlapping generation model where children's habits are impacted by parents' drinking patterns. This modeling choice is associated with the observation that, as the bulk of the consumption of alcohol starts late relative to other food items, parental consumption habits forms a benchmark impacting future consumption patterns.

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<sup>2</sup> The macro applications include patterns of savings, saving and growth, and the equity premium puzzle. See Browning and Lusardi (1996), Carroll et. al. (2000), and Constantinides (1990).

Our presumption is that patterns of alcohol consumption are impacted by parents' preferences, shaping the attitudes and habits of their children. A convenient way of modeling such an environment is in an overlapping generational structure, where the conventional constant elasticity of substitution (CES) framework is extended by allowing for habit formation.<sup>3</sup> Globalization impacts the opportunity set by introducing foreign varieties and modifying relative prices. Habit formation tends to slow the adjustment to the new equilibrium, an equilibrium that shifts the consumption patterns away from autarky.

This paper also relates to the existing literature on culture and trade. One such article is by Janeba (2004), who builds cultural identity into a Ricardian-style model. In this model, the utility from consuming one of two cultural goods increases with the share of other consumers that also consumed your cultural good. Francois and Ypersele (2002) consider the context under which the protection of a cultural good could be Pareto improving. In a two-stage investment model, Hollywood has the first mover advantage over local films. In their model, protection is a Pareto improvement: it lowers Hollywood's fixed investment, allowing local film producers to become profitable. Suranovic and Winthrop (2003) allowed for the presence of "cultural externality," where consumers of a product receive utility from others' consumption of a domestic good. They showed that such an externality mitigates the gains from international trade. Our model does not take a position on cultural externalities in the context of alcohol, as the salient features of wine and beer consumption can be accounted for

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<sup>3</sup> The CES framework is developed in Dixit and Stiglitz (1977), Krugman (1979, 1980), and Krugman and Helpman (1985).

in a model that focuses on habit formation. Yet, it can be extended to account for any cultural features associated with the joy of sharing your drinking preferences with the Joneses.<sup>4</sup>

Overall, the trade and culture literature that we know of is concerned with the dominance of Hollywood movies and other high fixed cost industries. In sharp contrast, the case of wine and beer considered in this paper is not a big country-little country interaction. This paper will begin with an analysis of beer and wine consumption data across 38 countries from 1963-2000. During the thirty-eight year time period, we find strong convergence of relative wine consumption across countries. Furthermore, while latitude and grape production do fairly well at explaining the 1963 consumption patterns, these endowment effects are much less significant in 2000. We will illustrate that culture continues to matter in the case of Latin America. Finally, we will offer a model of habit formation that is consistent with the empirical results.

## **II. Data**

Ideally, we would prefer to rely on detailed price and quantity data covering several decades of wine, beer, spirits, and flavored alcoholic beverage purchases. This would allow us to evaluate GDP shares, and patterns of alcohol consumptions in a panel of developing and developed countries. Unfortunately, such data is not available. Data scarcity compelled us to scale down the data requirements in order to maximize the sample size, covering a wide array of developing and OECD countries for several decades. These considerations induced us to focus on the share of wine consumption in the total of beer and wine consumption.<sup>5</sup> The

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<sup>4</sup> The empirical literature dealing with global convergence of consumption patterns is, to our knowledge, scarce. See István and Ohashi (2005) for evidence of convergence in cross-country consumption patterns across the OECD with substantial heterogeneity across products and countries.

<sup>5</sup> The data is from a book entitled "World Drink Trends 2004," published by the World Advertising Research Center, in association with the *Commissie Gedistilleerd* (Commission for Distilled Spirits) in the Netherlands.

consumption of beer and wine are measured in liters per capita. The thirty-eight countries with complete time series, 1963-2000 are listed in Table 1.<sup>6</sup>

### **III. Results**

#### **III.A. Evidence of Convergence**

To begin we look for evidence of taste convergence. In Figure 1, the wine shares from all of the 38 countries are plotted for the years 1963-2000. Convergence of the 38-country panel is immediately obvious. One characteristic of the data is that countries whose consumption is wine-intensive in 1963 become relatively more beer-intensive as time goes on. More specifically, the maximum wine share in 1963 is 96.3% (Portugal) and the maximum wine share in 2000 is 64.5% (Italy). At the other end of the spectrum, one beer-intensive country, Mexico, consumes less than 1 percent wine during the entire forty-year sample. In fact, the Mexican wine share actually drops from 0.8% to 0.4% over the time period. However, beyond the Mexican exception, the beer-intensive countries are also becoming more wine intensive, with the minimum wine share from 1.7% (Japan) in 1963 to 3.7% (Brazil) in 2000.

Figure 2 is a graph containing the sample standard deviation of the wine consumption shares across the 38 countries for every year in the sample. It illustrates the strong sigma convergence in the panel data. The sample standard deviation of the wine shares is 0.312 in 1963, and almost halves to 0.167 in 2000. When the sample standard deviations are regressed

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<sup>6</sup> For most countries, beer and wine accounts for well over three quarter of total volume of alcohol consumption. As we lack price information, we focus on the relative quantities of wine and beer consumed as an indicator of revealed preference between two major categories of alcohol consumption.

against a time trend, the annual decline in standard deviation is found to be 0.004. This coefficient is significant with a p-value of 0.000.

### **III.B. Convergence Clubs?**

Because the extent of integration varies across countries, convergence should be faster among certain groups of countries than others. Table 2 contains the basic convergence statistics of the entire group of countries alongside sixteen subsets of countries. The actual countries in each of these groups are provided in the data appendix. Of the sixteen country groups, five groups do not display sigma convergence: German Legal Origin, Scandinavian Legal Origin, NAFTA, US-Canada, and Benelux countries. These failures in sigma convergence do not undermine our hypothesis for two reasons. First, these groups appear to have converged substantially prior to 1963, since these groups have five of the six lowest country group variances in 1963. Second, these beer-intensive consuming groups are increasing their wine shares significantly over the four-decade period. This observation suggests that, although there might be a slight increase in variance across those countries, the group as a whole is converging toward a global equilibrium.

In terms of groups that appear to be “already converged”, the following groups had under half the variance of the entire sample in 1963: German Legal Origin, Scandinavian Legal Origin, NAFTA, US-Canada, Benelux, and Australia-New Zealand. These groups are very small, with five or fewer countries in each. They are also geographically and culturally linked.

Other country groups converged rapidly - they reduced their variance faster than the entire sample, suggesting that strong within group convergence occurred between 1963 and 2000. Those groups were: British Legal Origin, Socialist Legal Origin, Treaty of Rome



Europe, Euro countries, OECD countries in 1961, and Developed Countries. Each of these groups of countries has a history of institutions that promote integration within the group, such as British Colonialism, COMECON, the European community, or the OECD.

Somewhat cynically, an alternative explanation for cross group variances is country size dispersion, calculated for a group  $j$  containing  $i$  countries using the formula below:

$$\text{Size Dispersion} = \sqrt{\sum_{i \in j} \left( \frac{GDP_i}{\sum_{i \in j} GDP_i} \right)^2}$$

The correlation coefficient between a group's size dispersion and its sample standard deviation is lower than -0.70 in both years, suggesting that the unweighted variance of wine shares is negatively related to size dispersion. However, it is also worth noting that changes in size dispersion are not significantly correlated with changes in sample standard deviation, probably because the changes in size dispersion are small.

Turning the focus away from  $\sigma$ -convergence toward the wine shares themselves, the average wine share for the entire sample fell from 34.3% in 1963 to 24.6% in 2000. The most wine-intensive consumers throughout the forty-year sample are those of French Legal Origin, and members of the Euro. The high consumption in these groups is associated with the high degree of wine consumption in European romance language countries.

Developing countries were the second highest wine consumption group in 1963. However, in 2000, their consumption fell to the eleventh highest level of wine consumption. This is not very surprising because a liter of beer is, on average, less expensive than a liter of wine. Furthermore, the income elasticity in the U.S. market is higher for wine than beer.<sup>7</sup>

There is also clear evidence of economic integration in Table 2. One measure of the

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<sup>7</sup> See Azzam *et al.* 2004.

degree of economic integration is openness, measured as the sum of all exports and imports divided by GDP. The GDP-weighted average of openness of the entire sample of countries increased from 0.249 in 1963 to 0.463 in 2000. In all cases, country group level openness increased over the sample period.

### **III.C. Predictors of the 1963 distribution – Grape Production and Latitude**

Although a common intuition could be that cultures dictated wine consumption, the 1963 distribution appears to have reflected the ability of a country to produce grapes. For 1963, high wine shares are positively correlated with per capita grape production in Figure 3. The impact of globalization has been to decrease this correlation, since grape production is far less important in Figure 4. In terms of correlation coefficients, the correlation between wine shares and grape production is 0.90 in 1963, while the comparable correlation in 2000 is 0.64.

Similarly, the latitude of a country's capital is also a crucial factor in determining 1963 wine consumption in Figure 5. In fact, each of the 14 countries with wine shares over 50% in 1963 has a latitude index between 0.31 and 0.51. Similar to the grape production case, the relationship between latitude and wine shares is less significant for the year 2000 in Figure 6. In this case, the apex of the quadratic fit falls from a wine share of 50% in 1963 to 30% in 2000. While the consumers in many of the high intensity wine countries decrease their relative consumption of wine over time, consumers from many of the high latitude index countries increase their relative consumption of wine.

### **III.D. Is this a Cultural Matter?**

The starting point for considering the role of culture in the wine and beer panel data is to return to the common perception that the French drink wine, while the Germans drink beer.

The latitudes of Paris and Berlin, or the 1963 grape production can explain this phenomenon. However, anyone that has crossed the border between Germany and France, also knows that it is a cultural matter. The German *Bauhaus* is a world away from the French *chateau*. Nonetheless, there is clear evidence of convergence in relative wine consumption between Germany and France over the past forty years in Figure 7. The relative wine consumption in France falls from 77.7% to 60.7% while in Germany it rises from 11.9% to 15.6%. This convergence also provides evidence of habit formation: despite the fact that neighboring countries have had jumps in economic integration, the responses of consumption are slowed by cultural patterns.

An additional cultural note comes from Latin America. There are six Latin American countries in the data set: Argentina, Brazil, Chile, Mexico, Peru, and Uruguay. One might think that the effect of Spanish and Portuguese occupation would be that Latin American countries would be wine consumers. However, in Figure 8, Mexico, Peru, and Brazil all have minimal wine consumption by the year 2000. The three other countries Argentina, Chile, and Uruguay drink a significant amount of wine.

This result can be explained by latitude, or grape production. However, it can also be explained by culture. Latin American countries gained independence in the early 1800's while Spanish resources were distracted by the Napoleonic wars. Since that time, the number of Europeans living in these countries has changed notably. In Argentina, Chile and Uruguay, the share of population that is considered of European descent is 85% or higher.<sup>8</sup> However, the share of European descendants is much smaller in the beer drinking countries. In Brazil the European descendants make up 55% of the population, while in Mexico and Peru the

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<sup>8</sup> This data is from the Lonely Planet Online WorldGuide, <http://www.lonelyplanet.com/destinations/>, access date 1/10/05.

equivalent share is below 15%. We will not pursue the reasons for this disparity in European descendants; we simply want to note that European descendants may provide a cultural explanation for high wine consumption. However, it may not be a matter of coincidence that European descendants live in countries with the latitudes and grape production that increase wine consumption.

Both the French-German example and the Latin American example highlight the fact that international cultures reflect the resources available. The examples also suggest that economic integration between countries with different resources will increase the cultural diversity of consumption.

### **III.E. Evidence of Habit Formation**

Although many of the above results may seem consistent with a neoclassical model of trade, the evidence supports a model of habit formation. The clearest example of habit formation comes from the original six European countries that signed the Treaty of Rome in 1957. Europe's internal market experienced two formal episodes of trade liberalization. First, in the late 1960's, tariffs and quotas were removed. Second, in 1993, the Single Market Act was completed, removing much of the regulation that limited free trade. Nonetheless, in Figure 9, you can see that there is no immediate impact of either episode upon the wine share for any of the six countries. The smoothness of adjustment in Europe suggests that the neoclassical model cannot explain the dynamics of economic integration and consumption. Furthermore, Mexico is not converging despite the creation of NAFTA in 1994. Although Mexico had a 20% import tariff on wine that was phased out until 2003, the wine share

remains under 0.5% in 2002.<sup>9</sup>

#### IV. A Model

Our presumption is that wine and beer tastes are shaped by habits, income, endowment and prices. Habits are, by definition, backward looking, and may be shaped by parents impacting their children's lifestyles. We capture these considerations applying an overlapping generational structure, where deviations from past habits are costly. Globalization is viewed as the dismantling of trade barriers, allowing the introduction of new varieties. We illustrate the model by tracing the dynamics of adjustment to the introduction of a new variety.

We start with the base specification: the utility associated with consumption at time  $t$  is assumed to be:

$$(1) \quad Y_t + a \left[ \sum_{i=1}^k (X_{i,t} - \lambda [X_{i,t} - X_{i,t-1}]^2)^\gamma \right]^{\delta/\gamma} ; 0 < \delta; \gamma < 1, 0 \leq \lambda,$$

where  $Y_t$  denotes the outside homogenous good;  $X_i$  is the consumption at time  $t$  of variety  $i$ ,  $a$  is a constant. The term  $\lambda$  reflects the impact of habits on the utility from  $X_{i,t}$ . Deviation from the habitual consumption,  $X_{i,t-1}$ , reduces the utility from consuming  $X_{i,t}$  by a quadratic term,  $\lambda [X_{i,t} - X_{i,t-1}]^2$ . To simplify the dynamics, we consider an overlapping generation interpretation of (1), where consumption of goods  $X, \{X_{i,t}\}_{i=1,n}$ , is in the second period of life. Habits are determined by the parents' consumption, summarized by  $\{X_{i,t-1}\}_{i=1,n}$ .

The first order condition determining the consumption level of variety  $j$  is:

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<sup>9</sup> The data are not complete for the years 2001-2002, however, we do have data for Mexico.

$$(2) \quad p_{j,t} = a\delta(1 - 2\lambda[X_{j,t} - X_{j,t-1}]) \left[ \sum_{i=1}^k (X_{i,t} - \lambda[X_{i,t} - X_{i,t-1}])^2 \right]^{\frac{\delta}{\gamma}-1} (X_{i,t} - \lambda[X_{i,t} - X_{i,t-1}])^{\gamma-1}$$

A long run equilibrium corresponding to a given price vector is reached when the consumption of each variety is stable overtime. The dynamics of the system can be grasped by studying a simple case. Suppose that starting from a long-run equilibrium with  $n-1$  varieties, the price of each is  $p$ , a new variety is introduced, priced at  $p_n$ . This may correspond to the introduction of a product, or opening the market to foreign imports. The dynamic adjustment, assuming large  $n$ , is portrayed by the following first order condition:

$$(3) \quad p_n = a\delta(1 - 2\lambda[X_{n,t} - X_{n,t-1}]) \left[ (n-1)(X_r)^\gamma + (X_{n,t} - \lambda[X_{n,t} - X_{n,t-1}])^2 \right]^{\frac{\delta}{\gamma}-1} (X_{n,t} - \lambda[X_{n,t} - X_{n,t-1}])^{\gamma-1}$$

where  $X_r$  is the consumption level of the representative variety, corresponding to the  $n-1$  old varieties.<sup>10</sup> Hence, the long run equilibrium level of the new variety is determined by

$$(4) \quad p_n = a\delta \left[ (n-1)(X_r)^\gamma + (X_n)^\gamma \right]^{\frac{\delta}{\gamma}-1} (X_n)^{\gamma-1}.$$

Applying (3) we infer that, in the vicinity of the long run equilibrium, where  $X_{n,t} \cong X_{n,t-1}$ :

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<sup>10</sup> To simplify, we assume that  $n$  is large enough so we can ignore the changes in the consumption patterns of the old variety.

$$(5) \quad \frac{dX_{n,t}}{dX_{n,t-1}} \Big|_{LR} = \frac{2\lambda}{2\lambda + (\gamma - \delta) \frac{(X_n)^{\gamma-1}}{(n-1)(X_r)^\gamma + (X_n)^\gamma} + (1-\gamma)(X_n)^{-1}}$$

The dynamics of the system are summarized by the following claim:

**Claim 1:**

The system will converge to a stable long run equilibrium if  $\frac{dX_{n,t}}{dX_{n,t-1}} \Big|_{LR} < 1$ .

A sufficient stability condition is  $\delta < \gamma$ . This is equivalent to the assumption that the elasticity of substitution within the sector [i.e., between varieties,  $1/(1-\gamma)$ ] is larger than the overall price elasticity determining the substitutability of the sector with the outside good  $[1/(1-\delta)]$ .

The claim follows from (5). This equation determines also the speed of adjustment, implying that the adjustment is slower the greater is the importance of habitual consumption. The dynamics of adjustment are summarized by Figure 10, tracing the dependence of present consumption ( $X_{n,t}$ ) as a function of the past consumption ( $X_{n,t-1}$ ). The slope of the line increases with the habit formation coefficient ( $\lambda$ ), implying slower convergence.

A more comprehensive version of our model recognizes that wine and beer are imperfect substitutes. Let us denote by  $W_{k,t}$  the consumption of wine  $k$  at time  $t$ ; similarly,  $B_{i,t}$  is the consumption of beer  $i$  at time  $t$ . The utility at time  $t$  is the outcome of CES aggregation across wine and beer, plus the outside good, allowing for habit formation:

$$(6) \quad Y_t + a \left[ \theta_b (B_t)^\delta + (1 - \theta_b) (\Omega_t)^\delta \right]^{\phi/\delta};$$

$$B_t = \left[ \sum_{i=1}^m (B_{i,t} - \lambda[B_{i,t} - B_{i,t-1}])^2 \right]^{1/\gamma}$$

where

$$; 0 < \phi < \delta < \gamma < 1; \quad 0 < \theta_b < 1.$$

$$\Omega_t = \left[ \sum_{k=1}^v (W_{k,t} - \lambda[W_{k,t} - W_{k,t-1}])^2 \right]^{1/\gamma}$$

It can be verified that the dynamics of adjustment are similar to the ones depicted in Figure 1, where the convergence speed is determined by the strength of habit formation ( $\lambda$ ). Our model can be extended to account for neighborhood and network effects. Specifically, as drinking is frequently a social activity, affinity of tastes may impact the utility associated with social drinking. Such an extension may explain the patterns of countries characterized by social and taste fragmentation, as may be the case in several Latin-American countries. It may also explain the absence of convergence in Brazil, Peru and Mexico.

## Discussion

Our generic habit formation model explains the time consuming adjustment to changes in relative prices, predicting that a country will converge to a stable equilibrium following a change in relative prices. Moving from autarky towards free trade implies that the relative price of Beer/Wine moves from a level where grape availability determines the relative price and patterns of consumption, towards the international relative price. It also implies that greater trade integration weakens the association between production and consumption patterns. If all countries share similar preferences, converging towards the international relative price implies also the convergence of relative consumption patterns. The results reported in Figures 3-6, comparing the cross country association between wine shares, grape production and latitude at the beginning and the end of the sample period, are consistent with an adjustment from autarky towards free trade.



We close this section by noting that alcohol consumption patterns are impacted by cultural factors, some of which may be modeled by relying on other variants of habit formation. Specifically, our habit formation model assumed that an individual's current preferences depend on past consumption patterns, as in Pollak (1970). Another dimension of habit formation may apply the "Keeping up with the Joneses" patterns of behavior -- the case where an individual's current preference is impacted by consumption patterns of a reference group. Globalization may impact overtime the definition of "the Joneses," as well as their taste, leading possibly towards taste convergence across countries. This may be the outcome of higher immigration and tourism rates, as has been the trend in Europe and the US during the last fifty years. It may be also the by-product of the formation of a new collective identity -- a possible outcome of the EU project. These factors have been well acknowledged by the anthropological literature, but are understudied in Economics. For example, a comprehensive study by the *Social issues research center* [Oxford, UK] reports that<sup>11</sup>

"The anthropological literature shows how central aspects of culture can radically shape the ways in which people learn to drink and the patterns of behaviour which are associated with alcohol consumption. It is also clear that the process of 'acculturation', whether induced by colonial domination, tourism or economic and cultural 'convergence' such as that currently occurring in parts of Europe, can introduce styles of drinking with which previously existing cultural frameworks are unable to cope."

While these issues are beyond the scope of our paper, the habit formation model can be extended to account for cultural dynamics. Specifically, we extend equation (1) by adding the "Keeping up with the Joneses" motive:

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<sup>11</sup> See *Social and Cultural Aspects of Drinking*, An eight-part report presented to the European Commission 29/11/2000; available at [http://www.sirc.org/publik/social\\_drinking.pdf](http://www.sirc.org/publik/social_drinking.pdf) . It includes a detailed analysis of the changing patterns of alcohol culture in Europe.

$$(1') \quad Y_t + a \left[ (1-k) \left\{ \sum_{i=1}^k (X_{i,t} - \lambda [X_{i,t} - X_{i,t-1}]^2)^\gamma \right\} - k \left\{ \sum_{i=1}^k (X_{i,t} - \tilde{X}_{i,t})^\gamma \right\} \right]^{\delta/\gamma};$$

$0 < \delta$ ;  $\gamma < 1$ ,  $0 \leq \lambda$ ,  $0 \leq k \leq 1$ , where  $\tilde{X}_{i,t}$  is the consumption of variety  $i$  by the “Joneses” reference group. Equation (1') extends (1) by “penalizing” the utility from consuming a vector  $\{X_i\}$  by a weighted distance between  $\{X_i\}$  and the reference group's consumption,  $\{\tilde{X}_i\}$ . The parameter  $k$  is the weight attached to “Keeping up with the Joneses” motive, whereas  $1 - k$  is the weight attached to the direct utility associated with consuming  $\{X_i\}$  [note that for  $k = 0$ , equation (1') equals to (1)]. Equation (1') is useful in tracing the implications of an exogenous change in the reference group, and can be applied to explain cultural ‘convergence’ such as that currently occurring in parts of Europe, and similar cultural dynamics.<sup>12</sup> Applying the logic of our previous discussion, it follows that:

**Claim 2:**

The consumption patterns associated with maximizing (1') will converge to a stable long run

equilibrium if  $\left. \frac{dX_{n,t}}{dX_{n,t-1}} \right|_{LR} < 1$ . A sufficient stability condition is  $\delta < \gamma$ . A change in the

consumption vector of the reference group,  $\{\tilde{X}_i\}$ , would tilt the new long run equilibrium towards the new reference vector, at a rate that increases with  $k$ . The adjustment speed to the new long run equilibrium increases with the value of  $k$ , and decreases with the value of  $\lambda$ .

Globalization operates both by inducing convergence of relative prices, and by homogenizing the reference group across countries. The consumption function (1') traces

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<sup>12</sup> Of course, (1') does not provide information about the identity of reference groups -- the anthropological literature referred above provides useful guidance on these issues.

both effects in the form of a weighted average. Data scarcity does not allow us, at this stage, to test fully the relative strength of the two factors. Arguably, the formation of the EU impacted both margins: free trade and convergence of taxes on alcohol and the on-set of cultural convergence helped in inducing taste convergence. In contrast, Latin American countries approached free trade at a slower rate, and in several cases there seems to be little impetus for cultural convergence. Further investigation of these issues is left for future research.

## **V. Conclusion**

The French drink wine, while Germans drink beer. This common perception becomes increasingly inaccurate as time goes on. Over the past forty years, the “wine drinking” countries are drinking more beer and the “beer drinking” countries are drinking more wine. Using data on 38 countries from 1963-2000, there is clear convergence in the consumption of wine relative to beer between 1963 and 2000. Convergence occurs even more quickly within groups of countries that have a higher degree of integration. Although the relative consumption of wine can be explained well in 1963 by grape production and latitude, these variables are much less significant in 2000. Despite these “scientific” explanations for the consumption of wine, there is also a cultural angle to wine consumption. While the relative wine consumption of France and Germany is converging, several Latin American countries fail to converge. The number of European descendants in Latin American countries can explain large differences in relative wine consumption. These results are consistent with a model of habit formation in which children derive utility from consuming products similar to their parents.

## Data Appendix

The countries included in specific country groups are:<sup>13</sup>

**British Legal Origin:** Australia, Canada, Cyprus, Ireland, New Zealand, South Africa, United Kingdom, United States.

**French Legal Origin:** Algeria, Argentina, Belgium, Brazil, Chile, France, Greece, Italy, Luxembourg, Mexico, Morocco, Netherlands, Peru, Portugal, Spain, Tunisia, Turkey, Uruguay.

**Socialist Legal Origin:** Hungary, Poland, Romania.

**German Legal Origin:** Austria, Germany, Japan, Switzerland.

**Scandinavian Legal Origin:** Denmark, Finland, Iceland, Norway, Sweden.

**Treaty of Rome Europe:** Belgium, France, Germany, Italy, Luxembourg, Netherlands.

**Euro Countries:** Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain.

**NAFTA:** Canada, Mexico, United States.

**US-Canada:** Canada, United States.

**Benelux:** Belgium, Luxembourg, Netherlands.

**European continent:** Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Romania, Spain, Sweden, Switzerland, United Kingdom.

**Latin America:** Argentina, Brazil, Chile, Cuba, Mexico, Peru, Uruguay.

**Australia-New Zealand:** Australia, New Zealand.

**OECD countries in 1961:** Austria, Belgium, Canada, Denmark, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.

**Developed Countries:** Australia, Austria, Belgium, Canada, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States.

**Developing Countries:** Algeria, Argentina, Brazil, Chile, Hungary, Mexico, Morocco, Peru, Poland, Romania, South Africa, Tunisia, Turkey, Uruguay.

Real GDP and Openness values are from the Penn World Tables by Heston *et al* (2002)

Per capita grape production is measured using annual production data from FAOstat. The population figures in *World Drink Trends* were used to create per capita values.

Latitude data is provided by La Porta *et al* (1999). The latitude index is calculated as:  $\text{Abs}(\text{latitude of capital})/90$ .

The wine and beer data is from a book entitled "World Drink Trends 2005," Published by the World Advertising Research Center, in association with the *Commissie Gedistilleerd* (Commission for Distilled Spirits) in the Netherlands. The consumption of beer and wine are measured in liters per capita. We focus on the share of wine consumption in total beer and wine consumption.

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<sup>13</sup> The legal origin classifications are from La Porta *et al* (1999)

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**Table 1. Countries included in the study**

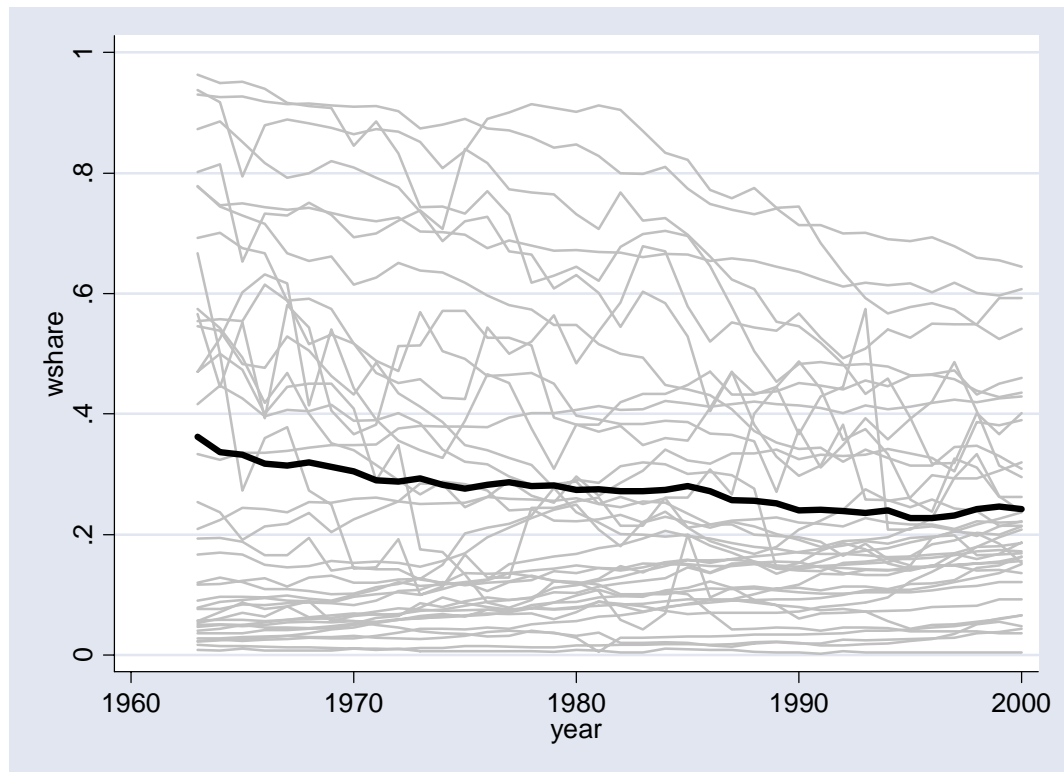
|           |            |              |                |
|-----------|------------|--------------|----------------|
| Algeria   | Finland    | Mexico       | Spain          |
| Argentina | France     | Morocco      | Sweden         |
| Australia | Germany    | Netherlands  | Switzerland    |
| Austria   | Greece     | New Zealand  | Tunisia        |
| Belgium   | Hungary    | Norway       | Turkey         |
| Brazil    | Iceland    | Peru         | United Kingdom |
| Canada    | Ireland    | Poland       | United States  |
| Chile     | Italy      | Portugal     | Uruguay        |
| Cyprus    | Japan      | Romania      |                |
| Denmark   | Luxembourg | South Africa |                |

**Table 2. The Convergence of tastes within country groups**

| 1963 Data              | Number    | Mean  | SD    | Trade  | Size       |
|------------------------|-----------|-------|-------|--------|------------|
| Country Group          | of        | Wine  | Wine  | Flows/ | (GDP)      |
|                        | Countries | Share | Share | Output | Dispersion |
| All Countries          | 38        | 0.345 | 0.326 | 0.249  | 0.385      |
| British Legal Origin   | 8         | 0.167 | 0.243 | 0.179  | 0.731      |
| French Legal Origin    | 18        | 0.524 | 0.341 | 0.298  | 0.349      |
| Socialist Legal Or.    | 3         | 0.425 | 0.263 | 0.396  | 0.671      |
| German Legal Origin    | 4         | 0.170 | 0.134 | 0.296  | 0.631      |
| Scandinavian Legal Or. | 5         | 0.074 | 0.032 | 0.506  | 0.532      |
| Treaty of Rome Europe  | 6         | 0.369 | 0.385 | 0.369  | 0.518      |
| Euro Countries         | 12        | 0.429 | 0.393 | 0.356  | 0.432      |
| NAFTA                  | 3         | 0.034 | 0.024 | 0.118  | 0.875      |
| US-Canada              | 2         | 0.047 | 0.015 | 0.113  | 0.927      |
| Benelux                | 3         | 0.129 | 0.108 | 0.906  | 0.705      |
| European continent     | 21        | 0.318 | 0.316 | 0.381  | 0.350      |
| Latin America          | 6         | 0.425 | 0.397 | 0.202  | 0.508      |
| Australia-New Zealand  | 2         | 0.036 | 0.020 | 0.333  | 0.828      |
| OECD countries, 1961   | 20        | 0.314 | 0.347 | 0.245  | 0.488      |
| Developed              | 24        | 0.273 | 0.336 | 0.245  | 0.444      |
| Developing             | 14        | 0.467 | 0.277 | 0.271  | 0.349      |

| 2000 Data              | Number    | Mean  | SD    | Trade  | Size       |
|------------------------|-----------|-------|-------|--------|------------|
| Country Group          | of        | Wine  | Wine  | Flows/ | (GDP)      |
|                        | Countries | Share | Share | Output | Dispersion |
| All Countries          | 38        | 0.246 | 0.167 | 0.463  | 0.388      |
| British Legal Origin   | 8         | 0.143 | 0.051 | 0.368  | 0.756      |
| French Legal Origin    | 18        | 0.311 | 0.208 | 0.589  | 0.332      |
| Socialist Legal Or.    | 3         | 0.255 | 0.090 | 0.809  | 0.679      |
| German Legal Origin    | 4         | 0.213 | 0.161 | 0.417  | 0.679      |
| Scandinavian Legal Or. | 5         | 0.197 | 0.033 | 0.816  | 0.506      |
| Treaty of Rome Europe  | 6         | 0.359 | 0.224 | 0.718  | 0.520      |
| Euro Countries         | 12        | 0.321 | 0.186 | 0.730  | 0.423      |
| NAFTA                  | 3         | 0.073 | 0.061 | 0.339  | 0.850      |
| US-Canada              | 2         | 0.107 | 0.020 | 0.312  | 0.921      |
| Benelux                | 3         | 0.248 | 0.123 | 1.493  | 0.704      |
| European continent     | 21        | 0.274 | 0.153 | 0.721  | 0.347      |
| Latin America          | 6         | 0.270 | 0.273 | 0.387  | 0.561      |
| Australia-New Zealand  | 2         | 0.179 | 0.010 | 0.490  | 0.881      |
| OECD countries, 1961   | 20        | 0.264 | 0.173 | 0.497  | 0.516      |
| Developed              | 24        | 0.252 | 0.161 | 0.456  | 0.460      |
| Developing             | 14        | 0.236 | 0.183 | 0.492  | 0.385      |

**Figure 1. International convergence in wine shares [the bold curve is the sample mean]**



**Figure 2. Sigma convergence in wine shares**

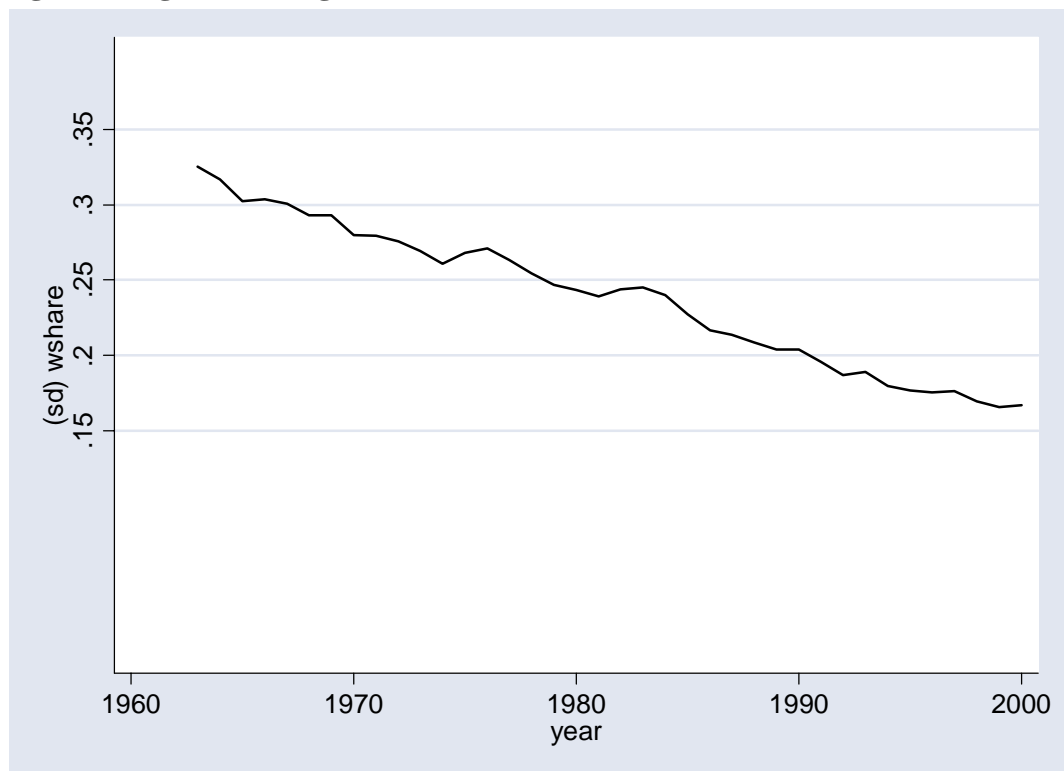




Figure 3. Wine shares and per capita grape production in 1963

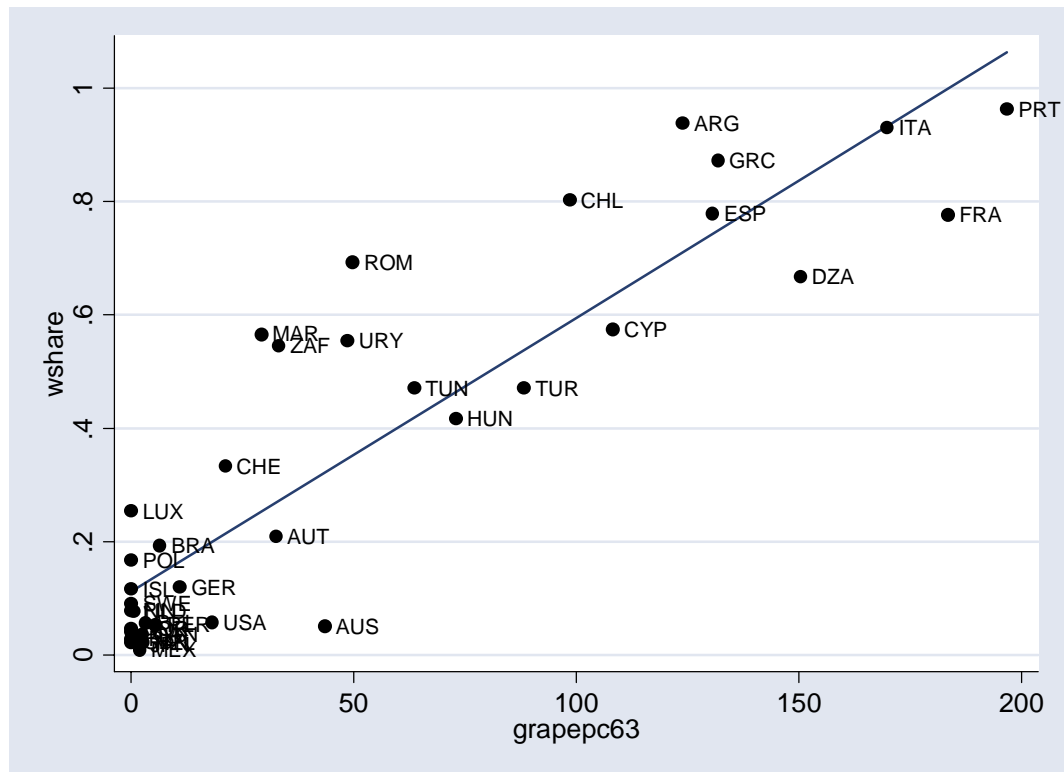


Figure 4. Wine shares and per capita grape production in 2000

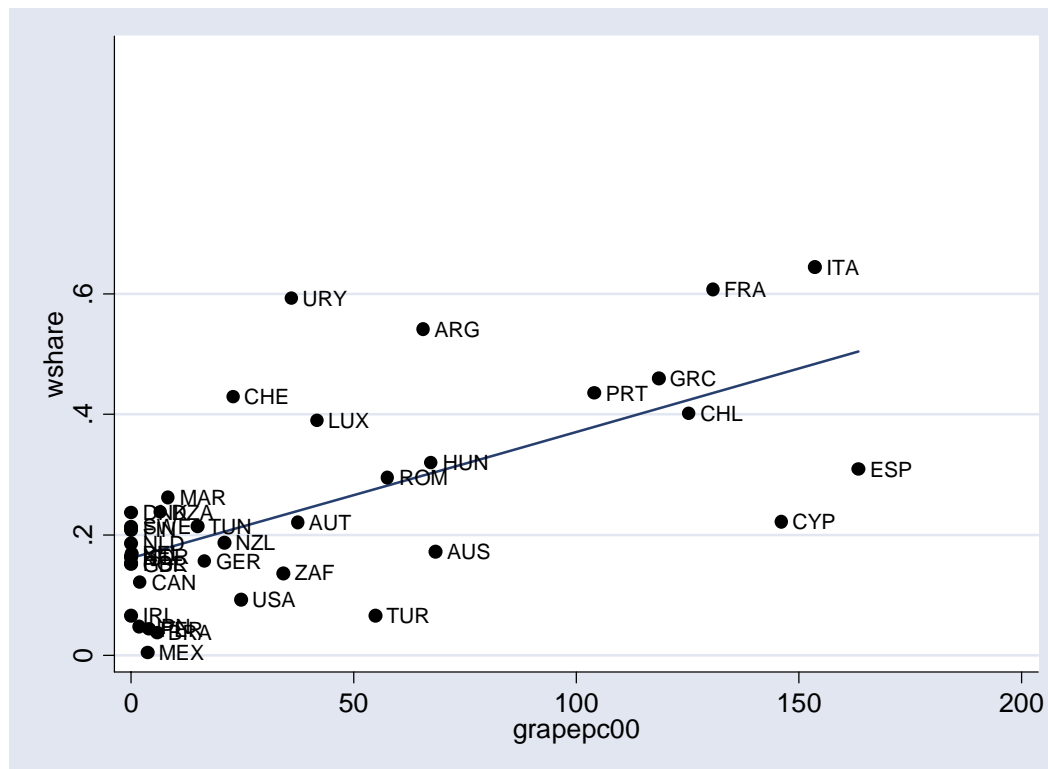


Figure 5. Latitude and wine shares in 1963

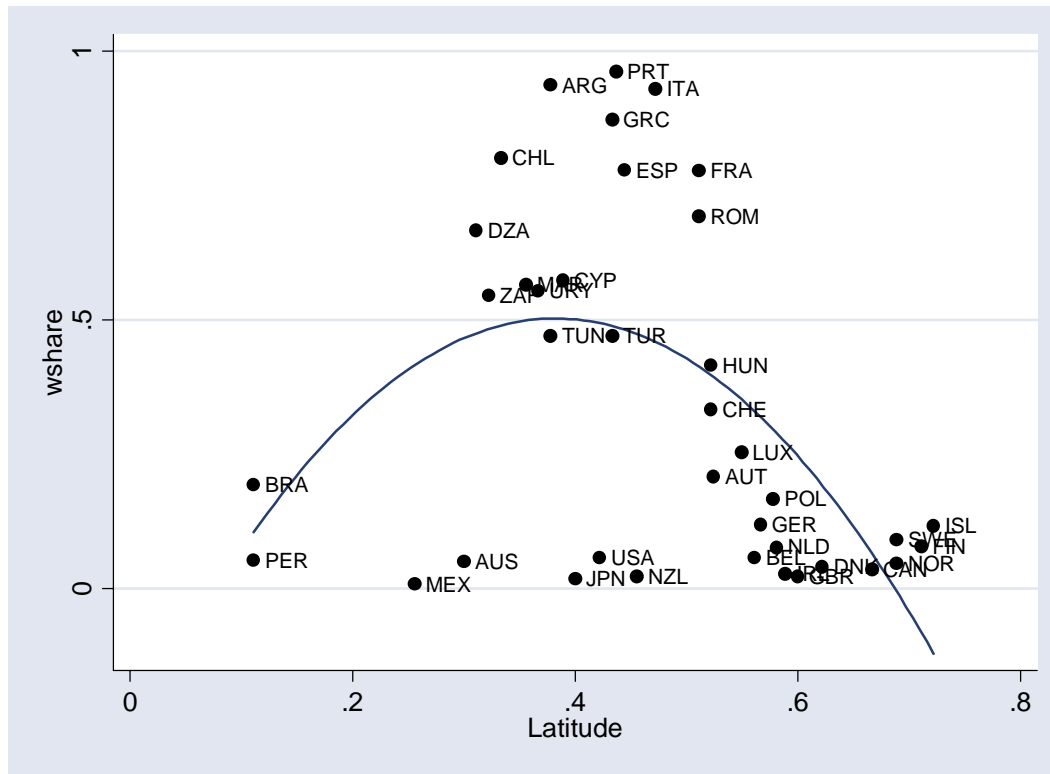


Figure 6. Latitude and wine shares in 2000

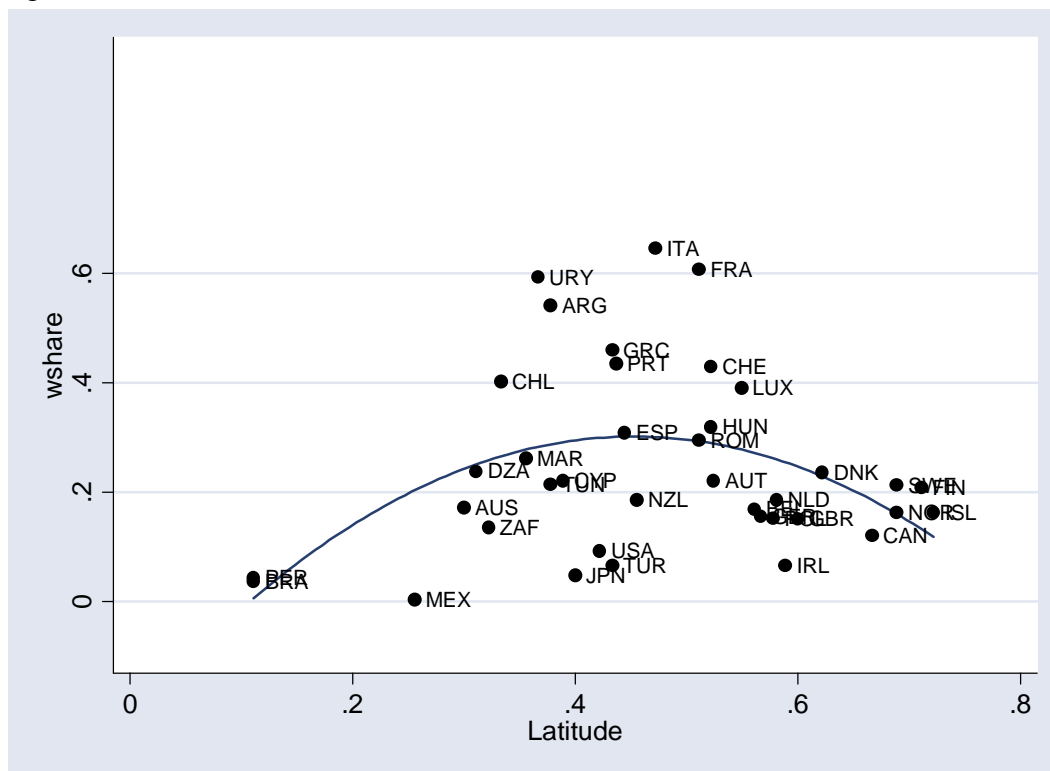


Figure 7: The convergence of France and Germany

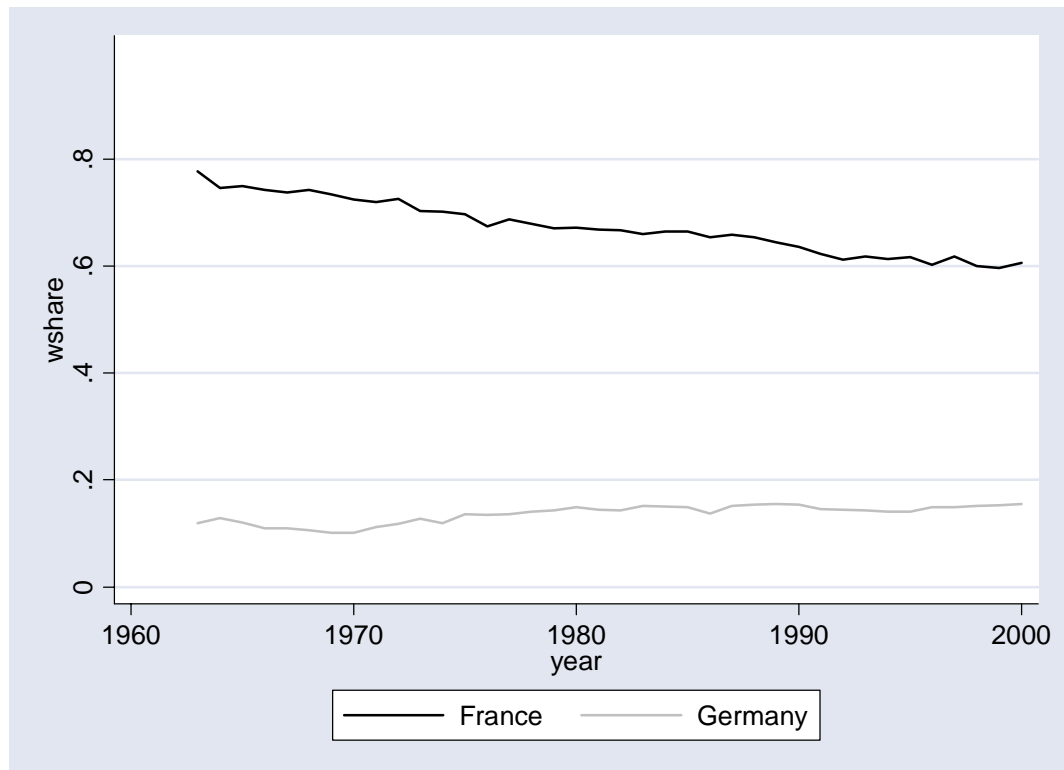


Figure 8: Latin America - A lesson about culture and colonialism?

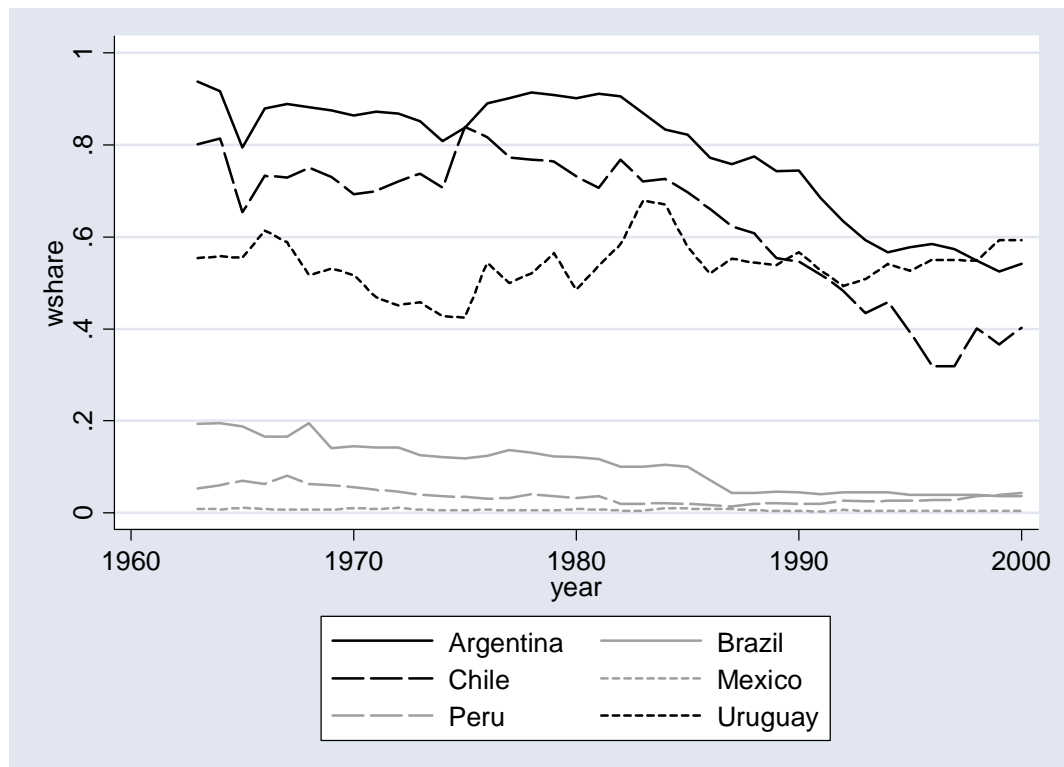


Figure 9: Europe - Evidence of habit formation

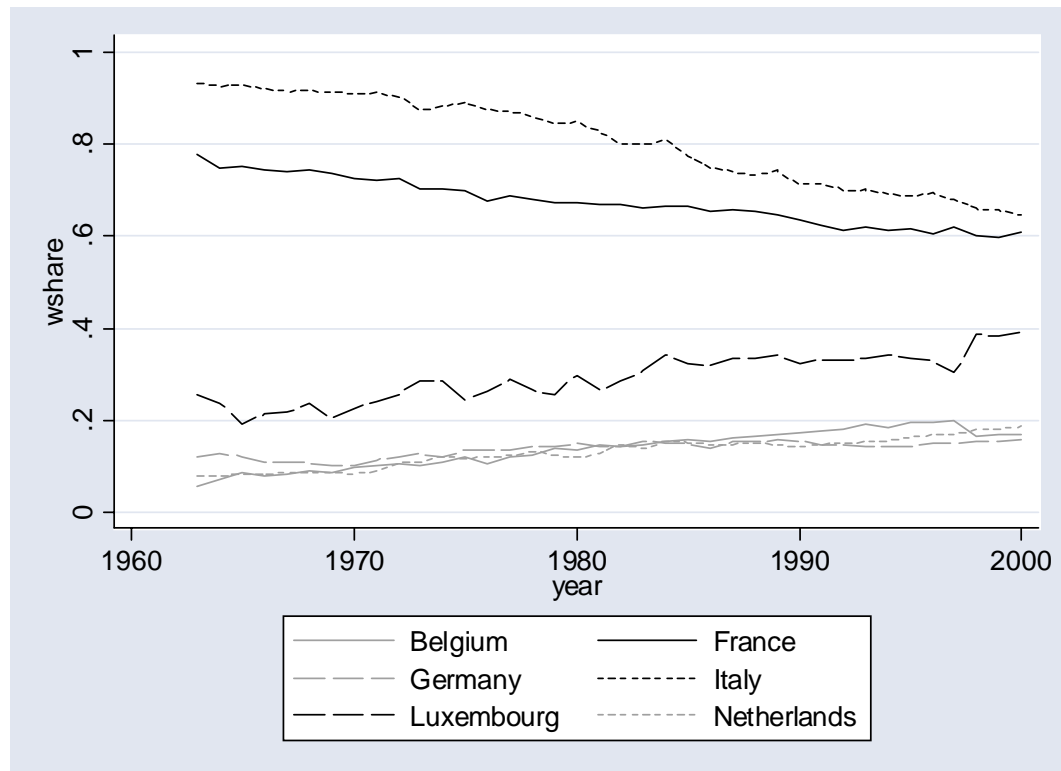


Figure 10: Adjustment to a new variety  
 The figure reports the simulation corresponding to  
 $n = 15$ ;  $\delta = 0.5$ ;  $\gamma = 0.6$ ;  $A = 0.1$ ;  $p_n = p = 0.1$

