Theoretical Economics Letters, 2025, 15(4), 1000-1020
https://www.scirp.org/journal/tel
ISSN Online: 2162-2086
ISSN Print: 2162-2078

Evolving Tipping Norms: A Dynamic Behavioural Model with Cross-Cultural Evidence

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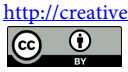
How to cite this paper: Li, K. O. H. (2025). Evolving Tipping Norms: A Dynamic Behavioural Model with Cross-Cultural Evidence. *Theoretical Economics Letters, 15,* 1000-1020.
https://doi.org/10.4236/tel.2025.154055

Received: February 11, 2025
Accepted: August 23, 2025
Published: August 26, 2025



Abstract

Tipping remains a behavioural paradox in economic literature, contradicting classical economic expectations of zero gratuity in one-off transactions. Building a dynamic behavioural model, this study investigates the evolution of tipping norms through individual utility maximisation, incorporating it into a broader cross-cultural context. The model is calibrated on U.S. data to pin the recursive norm parameter and evaluated with an OLS regression of cultural factors across 21 countries. Four major cultural indices—Embeddedness, Affective Autonomy, Intellectual Autonomy, and Cultural Tightness & Looseness—are adopted to understand how national cultural values modulate both the trajectory and strength of tipping norm growth. Comparatively, Embeddedness and Cultural Tightness emerge as the strongest correlations of tipping behaviour, whereas autonomy-oriented dimensions play a modest role. Contrary to conventional beliefs, the expected positive association between cultural tightness and tip inflation is also not supported by empirical evidence, indicating a more complex relationship between formal and informal norm enforcement than previously theorised. Cultures with a higher degree of embeddedness are further statistically shown to experience lower psychological penalties for undertipping. By connecting individual psychology with wider cultural influences, this research offers a cohesive framework for understanding how and why tip-inflation happens.

Keywords

Tip inflation, Social Norms, Cultural Value, Tipping Behaviour, Recursive Norm Feedback

1. Introduction and Literature Review

Tipping is a ubiquitous yet perplexing economic behaviour. In some countries,

such as the United States, leaving a gratuity for service is standard and expected, whereas in others, like Japan, tipping is not practised at all (Cho, 2005). These stark cultural variations in tipping norms raise fundamental questions: What drives people to tip even when no future service is guaranteed, and how do social norms surrounding tipping form and evolve? Existing research has labelled tipping a "behavioural puzzle" (Azar, 2009) because standard economic theory, which predicts zero tips in one-shot interactions, struggles to explain why rational consumers voluntarily pay extra. This puzzle invites a deeper exploration of the social and psychological forces at play. Seminal work in this area posits that tipping is primarily driven by social norms and their associated psychological payoffs rather than by repeated-game incentives or formal enforcement mechanisms (Azar, 2004a, 2005). From this perspective, social norms researchers posit that consumers tip to avoid the negative utility of guilt and social disapproval resulting from violating a norm.

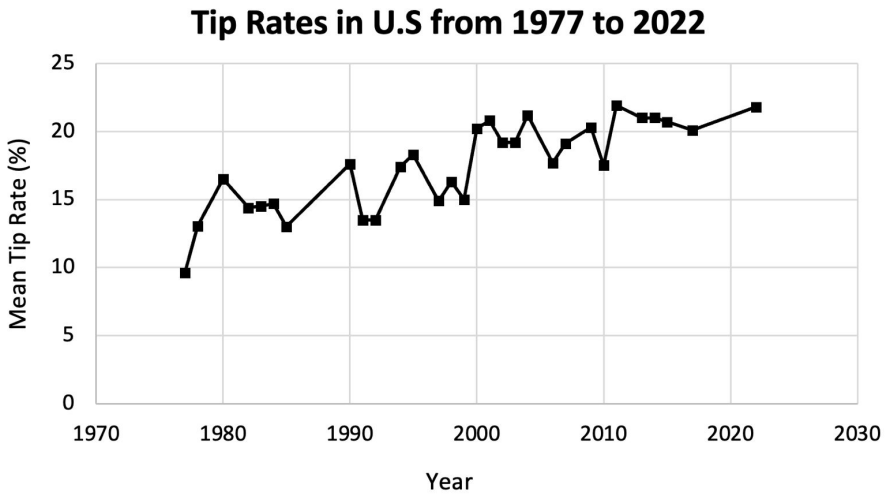


Figure 1. Trend in mean U.S. restaurant tipping percentage, 1977-2022.

Existing literature at the nexus of social norms and tipping behaviour, however, identifies a significant paradox. If tipping is primarily motivated by a sense of obligation or duty—that is, to avoid negative feelings—one might expect individuals to tip the minimum acceptable amount, leading to a stable or even declining norm over time (Azar, 2003). Contrary to this expectation, tipping norms, particularly in the United States, have strengthened rather than weakened. Empirically, as shown in **Figure 1**, the U.S. tip rates have generally risen from 1977 to 2022, reaching a socially undesirable high tipping point of 21.8% in 2022. This phenomenon is often regarded as "tip inflation". According to Azar (2004b), the most reasonable explanation would therefore be that tippers are also gaining positive utility when they tip more, for instance, to "impress others and improve their self-image as being generous and kind" (Azar, 2004b). Such behaviour can create a recursive upward pressure: if individuals consistently tip above the prevailing norm to derive positive utility, the norm itself will recalibrate upwards over time. In this view,

tipping confers utility to the giver by satisfying social-norm obligations and positive emotional motives that extend beyond simple cost-benefit analysis.

While the recursive nature of norm dynamics has been qualitatively recognised, prior economic models of tipping have remained mostly static. That framework did not endogenise the process by which today's tipping behaviour could potentially shape or influence tomorrow's norm, alongside the impact of cultural differences across nations on the strength of the social norm's influence.

To investigate these ideas, the paper adopts a dual approach. First, it develops a dynamic theoretical model that characterises conditions under which tipping norms escalate or stabilise over time, extending the framework proposed by Azar (2004a, 2005). Second, it conducts an exploratory cross-country empirical analysis to examine whether enduring cultural traits, measured through indices from Gelfand et al. (2011) and Uz (2015), are systematically associated with national tipping behaviours. In the absence of consistent time-series tipping data across countries, the analysis uses cross-sectional restaurant tipping levels as a proxy for norm intensity. The model's recursive structure, which uses lagged tipping behaviour to represent evolving social norms, is calibrated using U.S. data and is assumed to reflect structurally similar dynamics across countries. This assumption of cross-cultural structural invariance is acknowledged as a limitation, given potential heterogeneity in norm formation processes. As such, the empirical findings are best interpreted as suggestive correlations aligned with the theoretical framework, rather than conclusive tests of causality.

2. Conceptual Framework

Early economic analyses regarded tipping as an anomaly for standard rational-choice theory, as it essentially involves giving money away after service is rendered. The first formal model (Ben-Zion & Karni, 1977) concluded that tipping by one-time customers is inconsistent with self-interested utility maximisation, reinforcing the notion that classic incentives (such as future service improvements) cannot fully explain why people tip. Subsequent research shifted focus toward social norms and psychology. Psychologists had long noted that tipping is guided by internalised social norms—unwritten rules about who to tip and how much—which vary by country and context. Lynn (2006) and Azar (2007) provide extensive reviews of the multidisciplinary tipping literature, emphasising that tipping is a normative behaviour driven by feelings of obligation, fairness, and social approval.

Within economics, Ofer Azar has been a leading figure in formalising these ideas. Azar (2004b) modelled the evolution of tipping norms in society, suggesting a mechanism whereby tipping norms can emerge and change over time. Azar (2005) then presented a more micro-focused utility model of an individual tipping decision that explicitly included feelings and social norms. In that model, a customer's utility was:

Adopted from Azar's (2005) paper:

Customer's Utility Function in Azar (2005) is

$$u(s,t,b) = -b(1+t) + f\left(t - n(s)\right) + G(s,b)$$

where s is service quality, t is the tip percentage, b is the bill size, and $n(s)$ is the social norm function about how much should be tipped for each service quality. The first term, $-b(1+t)$, captures the cost of dining and leaving a tip. The last term of $G(s,b)$ is the utility from the dining experience, which depends on service quality and on the quantity and quality of food purchased, which are captured by the bill size. The function f captures the psychological utility derived from feelings and depends on the difference between the amount tipped (t) and the norm for how much should be tipped based on the service quality received.

This formulation captures two crucial aspects: 1) Norm compliance vs. deviance: the term $f\left(t - n(s)\right)$ represents the "utility from feelings" associated with tipping relative to the norm. Tipping exactly the norm ($t = n(s)$) might confer a sense of appropriateness or neutrality, whereas tipping less than the norm ($t - n(s) < 0$) brings guilt or fear of disapproval, and tipping more than the norm (positive $t - n$) brings pride or a "warm glow" from generosity. 2) Psychological motivation strength: Azar allows that the psychological utility may peak not at zero difference, but possibly at over-tipping. "There is no assumption that following the social norm exactly will lead to the highest utility", as Azar (2005) notes, meaning an individual's feelings might be maximised by tipping more than the norm if they derive extra satisfaction from generosity or some type of additional positive utility (Azar, 2004b). This was a key innovation, since it provides a fundamental rationale for tip inflation. If many individuals prefer to exceed the norm slightly, the norm itself will shift upward over time.

Azar's work thus established a foundation for understanding tipping as norm-driven behaviour with intrinsic rewards. However, Azar (2005) did not explicitly include culture, treating the function as universal through a conceptual model, which this paper aims to develop further.

Empirical studies and research have been conducted on the topic of the relevance between tipping and national culture. Lynn and Starbuck (2015) examined national differences in tipping norms and found that Hofstede's Four Dimensions' factors like Masculinity vs. Femininity (MAS) and Uncertainty Avoidance (UAI) correlate positively with tipping data; Higher masculinity was found to be positively related to both the size of tips and the number of tipped positions (Lynn & Lynn, 2004), as tipping is interpreted as a display of status (Shamir, 1984) and a form of conspicuous consumption (Lynn, 1997); also, studies suggest a positive relationship between uncertainty avoidance scores and the tips given to restaurant servers (Lynn & Lynn, 2004) and the number of tipped positions in general (Lynn & Mynier, 1993). While these studies demonstrate strong evidence of cultural influences, they often focus on tipping as a labour market phenomenon or examine cultural effects at the occupational or institutional level. Less attention has been

paid to formalising how these cultural factors quantitatively influence consumers' responses to social tipping norms over time. To address this gap, the present study introduces an alternative framework that incorporates four additional cultural indices, reflecting broad societal differences, into the mathematical tipping model, building on established findings from prior research. The model's parameters β and λ (Refer to Section 3.2) are introduced to reflect these differences.

3. Tipping Model and Mathematical Interpretation

This section will present the complete mathematical derivation of the time-deviated tipping model. The time-deviated tipping model retains the core structure of Azar's (2005) utility specification, calibrating the combined effects of disutility from monetary expenditure, psychological utility of tipping and utility from dining experiences, but is restructured to anchor to empirical tipping norms, and suitable to derive the comparative statics that link cultural tightness to the speed of tip inflation.

3.1. Notations and Definitions of Terms

Please refer to **Appendix 1** for the complete list.

3.2. Tipping Model

3.2.1. Utility Function

The customer/consumer utility function is modelled as

$$U\left(t_k, t_{k-1}^*, b, s\right) = -d\left(b, t_k\right) + f\left(t_k, t_{k-1}^*; \beta, \lambda, \gamma\right) + G\left(s, b\right)$$

where first term $U\left(t_k, t_{k-1}^*, b, s\right)$ is total utility of a consumer at time k, the second term $-d\left(b, t_k\right)$ is the monetary disutility (Indexed), the third term $f\left(t_k, t_{k-1}^*; \beta, \lambda, \gamma\right)$ is the Psychological utility (Indexed), and the last term $G\left(s, b\right)$ is the exogenous service-enjoyment utility.

In contrast to Azar's original formulation, which anchors the social norm to an abstract function $n\left(s\right)$, we replace $n\left(s\right)$ with the observed average tip from the previous period t_{k-1}^*. This is formally presented as $n\left(s\right) \equiv t_k$. Both $d\left(b, t_k\right)$ and $f\left(t_k, t_{k-1}^*; \beta, \lambda, \gamma\right)$ are scaled to the interval [0, 1], allowing for direct comparison of monetary and psychological utilities. To empirically establish the norm, we estimate t_{k-1}^* via a constrained OLS regression (through the origin) of this period's mean tip on the last period's mean tip using U.S. data (see **Appendix 2**). This produces a strong positive correlation and justifies treating t_{k-1}^* as the collective tipping expectation.

For simplicity, we further assume that all consumers possess perfect information about t_{k-1}^*, thus ignoring informational lags or learning processes. These simplifications—linking the social norm to realised tipping data, scaling the utility parts consistently, and assuming perfect foresight—result in a clear equilibrium condition that straightforwardly captures the ongoing feedback loop driving tip inflation.

3.2.2. Monetary Disutility d

The monetary disutility component in the utility model, modified from Azar (2005), is given by

$$m(b,t_k)=b(1+t_k)$$

where b denotes bill size and t_k is the tip rate at time k. To facilitate comparison of marginal effects and ensure both variables are on a common scale, min-max normalisation is applied to each dimension. For the economically relevant ranges $t_k \in [0,1)$ and $b \in [0,b_{\max}]$, the normalised components become:

$$(\nabla m)_{norm}=\begin{bmatrix} t_k \\ \dfrac{b}{b_{\max}} \end{bmatrix}$$

The composite monetary disutility is rewritten in the form:

$$d(b,t_k)=\frac{1}{\sqrt{2}}\cdot\sqrt{(t_k)^2+\left(\frac{b}{b_{\max}}\right)^2}$$

3.2.3. Psychological Utility f

$$f(x;\beta,\lambda,\gamma)=\begin{cases} e^{-\beta(x-\lambda)^2}, & x\geq 0 \\ e^{-\gamma\beta(x-\lambda)^2}, & x<0 \end{cases}$$

where $\beta>0$ controls the steepness of norm-conformity penalties (interpreted as the "painfulness" of undertipping), λ (strictly ≥ 0) determines the peak of psychological utility, and $\gamma>1$ imposes asymmetry, penalising under-tipping more significantly than over-tipping.

The graphical interpretation of psychological utility function $f(x;\beta,\lambda,\gamma)$ illustrates a skewed bell curve diagram—the peak of the curve $f=1$ is located at $x=\lambda$. If the tendency to "overshoot" socially acceptable tipping exists, $\lambda>0$, the peak shifts to the right of the prior norm.

The width of the curve is controlled by the parameter β, which determines how rapidly psychological utility falls off when deviated from λ. The larger the parameter β, the narrower and steeper the peak is observed. Economically, in this model, a larger β number could imply a more substantial influence of social norms on the individual's choice of tip rate.

The asymmetrical factor is designed to create a skew, matching the asymmetric punishment of under-tipping in line with Azar's work, where not tipping enough causes significant disutility due to social and psychological costs, and tipping more than the norm might generate some positive utility from the "warm glow" effects, for instance.

3.3. Key Derivatives of Functions f and d

3.3.1. Derivative of Monetary Disutility Function d

Differentiating $d(b,t_k)$ with respect to t_k,

$$d'(t_k) = \frac{t_k}{\sqrt{2}\sqrt{(t_k)^2 + \left(\frac{b}{b_{\max}}\right)^2}}$$

where $d'(t_k)$ measures the marginal monetary cost of increasing the tip rate by an infinitesimal amount. In the first-order condition for optimal tipping, this term is set equal to the marginal social-conformity benefit $f'(t_k - t_{k-1}^*)$, so that the extra dollar spent on the tip just compensates the additional disutility.

3.3.2. Derivative of Psychological Utility Function f

Differentiating $f(x;\beta,\lambda,\gamma)$ with respect to x where $x \geq 0$,

$$f'(x) = -2\beta(x-\lambda)e^{-\beta(x-\lambda)^2}$$

where $f'(x)$ is the marginal social utility of deviating from last period's norm by an amount x. Its sign and magnitude depend on whether x is below, at, or above the peak λ, and on the steepness β.

3.4. Equilibrium Condition

Let $x = t_k - t_{k-1}$ denote the deviation of the tip rate from the prevailing social norm, such that $x^* = t_k^* - t_{k-1}^*$ represents the equilibrium deviation capturing the rate of tip inflation year-over-year. Maximizing total utility U with respect to t_k yields the first-order condition:

$$0 = \frac{\partial U}{\partial t_k} - d'(t_k) + f'(x)$$

Given the normalization of the monetary disutility component, the equilibrium is obtained by equating the marginal monetary and psychological utilities, which for the functional forms specified in this model simplifies to:

$$2\beta(\lambda - x^*)e^{-\beta(x^*-\lambda)^2} = \frac{t_k^*}{\sqrt{2}t_k^*} = \frac{1}{\sqrt{2}}, \text{ for } d'(t_k) = \lim_{b_{\max}\to\infty}\left[\frac{t_k}{\sqrt{2}\sqrt{(t_k)^2 + \left(\frac{b}{b_{\max}}\right)^2}}\right]$$

This equilibrium condition characterizes the optimal tipping deviation x^*, allowing for comparative static analysis with respect to the key model parameters λ and β, while holding the other constant. This framework enables explicit examination of how changes in social norm sensitivity (β) or horizontal shift (λ) influence the trajectory of tipping norms over time.

3.5. Correlation with Cultural Index

This section investigates how cross-cultural values influence the evolution of tipping behaviour over time. The key variable of interest (x^*), is defined as the year-over-year change in the optimal tip rate. Specifically, the difference between the optimal tip rate at time k, (t_k^*), and the preceding period's social norm (t_{k-1}^*).

This difference is interpreted as a proxy for tip inflation, where higher values of x^* indicate a steeper increase in tipping expectations over time. With this interpretation, I have selected four country-level indices to examine the correlation between the x^* value and the individual cultural index. First, Embeddedness (EMB), based on Schwartz's Embeddedness orientation, reflects societies where individuals are seen as integral parts of the collective. In such cultures, meaning in life is mainly derived through social relationships and identification with group goals. High EMB scores will thus indicate a strong focus on maintaining the status quo, preserving in-group solidarity, and restraining actions that might disrupt traditional social order. Second, Affective Autonomy (AUT_AFF) measures the extent to which individuals are encouraged to pursue affectively positive experiences, such as pleasure, excitement, and comfort, regardless of group norms. Higher AUT_AFF values, therefore, denote a cultural allowance for personal gratification. Third, Intellectual Autonomy (AUT_INT) assesses the degree to which societies promote independent thought and the development of one's own ideas. Cultures with high scores on AUT_INT explicitly support exploring new intellectual directions, even when these conflict with prevailing social expectations. Finally, the Combination Cultural Tightness-Looseness (CTL_C) index, developed by Uz (2015), combines multiple norms enforcement axioms to gauge a society's tolerance for deviance. Higher CTL_C values correspond to greater looseness, indicating weaker sanctions against non-conformity. Empirical evidence also suggests that looser cultures tend to show more positive attitudes towards social deviance and stronger individualistic orientations. These indicators are chosen based on their qualitative assessments regarding cultural aspects. A correlation analysis of these aims to create a more comprehensive understanding of how cultural differences relate to tipping phenomena.

Subsequently, the hypotheses are as follows:

H1 (Embeddedness): Societies with greater embeddedness will show larger year-over-year increases in the average tipping rate. This indicates a positive correlation between embeddedness and tip inflation. H2 (Affective Autonomy): Societies emphasising affective autonomy are expected to have smaller annual increases in the tipping rate, suggesting a negative correlation between affective autonomy and tip inflation. H3 (Intellectual Autonomy): Societies that value intellectual autonomy are predicted to experience more moderate tipping inflation, implying a negative relationship between intellectual autonomy and yearly tipping fluctuations. H4 (Cultural Tightness-Looseness): Societies with looser norms, characterised by weaker enforcement, are expected to have lower tipping deviations than tighter societies, indicating a positive link between cultural tightness and tip inflation.

3.5.1. Relationship between λ and the Cultural Index

To analyse the sensitivity of the equilibrium tip deviation x^* to changes in the norm-shift parameter λ, the equilibrium condition is implicitly differentiated with respect to both x^* and λ:

$$F_{x^*} = 2\beta_i e^{-\beta_i\left(x^*-\lambda\right)^2}\left[2\beta_i\left(\lambda - x^*\right)^2 - 1\right]$$

$F_\lambda = 2\beta_i e^{-\beta_i\left(x^*-\lambda\right)^2}\left[1 - 2\beta_i\left(\lambda - x^*\right)^2\right]$, with the symmetry $F_\lambda = -F_{x^*}$

Consequently, implicit differentiation yields:

$$\frac{d\lambda}{dx^*} = -\frac{F_{x^*}}{F_\lambda} = 1$$

By application of the chain rule, and $\frac{dx^*}{dt_{k-1}^*} = -1$,

$$\frac{d\lambda}{d(\text{Cultural Index})} = -\frac{dt_{k-1}^*}{d(\text{Cultural Index})}$$

This establishes a direct and theoretically grounded relationship between the rate of change in the norm-shift parameter and the evolution of tipping norms as influenced by underlying cultural factors.

Interpretation of the relationship between λ and the Cultural Index:

- Positive: $\frac{d\lambda}{d(\text{Cultural Index})} > 0$ when $\frac{dt_{k-1}^*}{d(\text{Cultural Index})} < 0$; the higher the cultural index, the greater the horizontal shift of the psychological-utility peak.
- Negative: $\frac{d\lambda}{d(\text{Cultural Index})} < 0$ when $\frac{dt_{k-1}^*}{d(\text{Cultural Index})} > 0$; the higher the cultural index, the smaller the horizontal shift of psychological-utility peak.
- No relationship when there is little to no correlation between t_{k-1}^* and Cultural Index.

3.5.2. Relationship between β and the Cultural Index

A similar procedure is used to investigate the impact of the conformity parameter β on equilibrium tip deviation. Implicit differentiation with respect to β and x^* yields:

$$F_\beta\left(\beta, x^*\right) = 2\left(\lambda_i - x^*\right)e^{-\beta\left(x^*-\lambda_i\right)^2}\left[1 - \beta\left(\lambda_i - x^*\right)^2\right] = 0$$

$$F_{x^*}\left(\beta, x^*\right) = 2\beta e^{-\beta\left(x^*-\lambda_i\right)^2}\left[2\beta\left(\lambda_i - x^*\right)^2 - 1\right] = 0$$

Comparative static expression:

$$\frac{d\beta}{dx^*} = -\frac{F_{x^*}}{F_\beta} = \frac{\beta\left[2\beta\left(\lambda_i - x^*\right)^2 - 1\right]}{\left(\lambda_i - x^*\right)\left[1 - \beta\left(\lambda_i - x^*\right)^2\right]}$$

For small deviations where $\lambda - x^* \approx 0$, this simplifies to a negative value, indicating that increases in norm-conformity pressure (β) systematically reduce the equilibrium tip deviation. This approximation is valid throughout the empirically relevant range, given the construction of the equilibrium.

By application of the chain rule, $\frac{\mathrm{d}\beta}{\mathrm{d}t_{k-1}^{*}} = \frac{\mathrm{d}\beta}{\mathrm{d}x^{*}} \cdot \frac{\mathrm{d}x^{*}}{\mathrm{d}t_{k-1}^{*}} = \text{positive}$,

$$\text{sign of } \frac{\mathrm{d}\beta}{\mathrm{d}(\text{Cultural Index})} = \text{sign of } \frac{\mathrm{d}t_{k-1}^{*}}{\mathrm{d}(\text{Cultural Index})}$$

Since $\frac{\mathrm{d}\beta}{\mathrm{d}t_{k-1}^{*}}$ is signed by the curvature of f under this model, a culture that raises social norms t_{k-1}^{*} can alter the steepness β. Combined with $\frac{\mathrm{d}t_{k-1}^{*}}{\mathrm{d}(\text{Cultural Index})}$, the net effect of culture on the psychological sensitivity to norm deviation $\frac{\mathrm{d}\beta}{\mathrm{d}(\text{Cultural Index})}$ can thus be obtained.

Interpretation of the relationship between β and the Cultural Index:

- Positive: $\frac{\mathrm{d}\beta}{\mathrm{d}(\text{Cultural Index})} > 0$ when $\frac{\mathrm{d}t_{k-1}^{*}}{\mathrm{d}(\text{Cultural Index})} > 0$; the higher the cultural index, the steeper the psychological utility curve near the stationary point. Economically, this implies that customers feel more "pain" for undertipping.
- Negative: $\frac{\mathrm{d}\beta}{\mathrm{d}(\text{Cultural Index})} < 0$ when $\frac{\mathrm{d}t_{k-1}^{*}}{\mathrm{d}(\text{Cultural Index})} < 0$; the higher the cultural index, the gentler the psychological utility curve near the stationary point. Economically, this implies that customers feel less "painful" for undertipping.
- No relationship when there is little to no correlation between t_{k-1}^{*} and Cultural Index.

3.5.3. Relationship between x^{*} and the Cultural Index

$$\frac{\mathrm{d}x^{*}}{\mathrm{d}(\text{Cultural Index})} = \frac{\mathrm{d}x^{*}}{t_{k-1}^{*}} \cdot \frac{\mathrm{d}t_{k-1}^{*}}{\mathrm{d}(\text{Cultural Index})} = -\frac{\mathrm{d}t_{k-1}^{*}}{\mathrm{d}(\text{Cultural Index})}$$

Interpretation of the relationship between x^{*} and the Cultural Index:

- Positive: $\frac{\mathrm{d}x^{*}}{\mathrm{d}(\text{Cultural Index})} > 0$ when $\frac{\mathrm{d}t_{k-1}^{*}}{\mathrm{d}(\text{Cultural Index})} < 0$; if Cultural Index raises the norm, then it lowers the deviation x^{*}, implying slower tip-inflation.
- Negative: $\frac{\mathrm{d}x^{*}}{\mathrm{d}(\text{Cultural Index})} < 0$ when $\frac{\mathrm{d}t_{k-1}^{*}}{\mathrm{d}(\text{Cultural Index})} > 0$; if Cultural Index lowers the norm, then it raises the deviation x^{*}, implying more rapid tip-inflation.
- No relationship when there is little to no correlation between t_{k-1}^{*} and Cultural Index.

4. Empirical Analysis

To empirically evaluate the influence of national cultural values on tipping behav-

iours, I conducted an OLS regression of t_{k-1}^{*} on each of the Cultural Indices. The results are then further applied to the model established in Section 3 to perform correlation analyses between tipping deviations (x^{*}) and the four individual cultural indices. In this research, restaurant tipping rates were used as representative measures of hospitality tipping behaviour, treated as t_{k-1}^{*} values. Cultural scores for Embeddedness, Affective Autonomy, and Intellectual Autonomy were taken from Schwartz's cultural value orientations dataset, while the index for Cultural Tightness-Looseness (CTL_C) was drawn from Uz (2015) (Refer to **Appendix 3**).

4.1. Results

Table 1 shows that from all the selected cultural indices, the correlation between t_{k-1}^{*} and CTL_C is the greatest, followed by EMB.

Table 1. Sensitivity of tipping-model parameters to cultural indices and model fit statistics.

$\frac{\mathrm{d}(\text{Factor})}{\mathrm{d}(\text{Cultural Index})}$	Factor			R^2 value	Adjusted R^2 value
	λ	β	x^{*}		
EMB	+	−	+	0.3576	0.31981
AUT_AFF	−	+	−	0.2946	0.25051
AUT_INT	−	+	−	0.3216	0.28169
CTL_C	−	+	−	0.3756	0.32757

4.2. Statistical Results and Model Interpretation

Figure 2 shows a negative relationship between the EMB index and the Restaurant Tip. The results estimate that the derivative of λ with respect to Embeddedness is positive ($\frac{\mathrm{d}\lambda}{\mathrm{d}(\text{EMB})} > 0$) and the derivative of β with respect to Embeddedness is negative ($\frac{\mathrm{d}\beta}{\mathrm{d}(\text{EMB})} < 0$. Across the dataset, higher values of EMB are associated with higher values of λ and lower values of β in the tipping utility model. Within the model framework, an increase in λ represents a greater horizontal shift of the optimal tipping point from the individual's intrinsic norm toward the prevailing social norm, while a decrease in β reflects a reduced steepness of the psychological utility function near the optimum. The analysis also finds a positive correlation between EMB and the tip deviation (x^{*}), such that higher EMB is associated with larger increases in the norm over time ($t_{k}^{*} - t_{k-1}^{*}$), suggesting a greater rate of tip inflation (Hypothesis H1 is largely supported).

Figure 3 shows a positive relationship between the AUT_AFF index and the Restaurant Tip. The estimated derivative of λ with respect to AUT_AFF is negative ($\frac{\mathrm{d}\lambda}{\mathrm{d}(\text{AUT\_AFF})} < 0$) and the derivative of β with respect to AUT_AFF is positive ($\frac{\mathrm{d}\beta}{\mathrm{d}(\text{AUT\_AFF})} < 0$). Higher AUT_AFF values are observed alongside lower λ

and higher β values in the model estimates. The data further show a negative correlation between AUT_AFF and the tip deviation (x^*), indicating that greater affective autonomy is associated with smaller increases in tip over time (Hypothesis H2 is mildly supported).

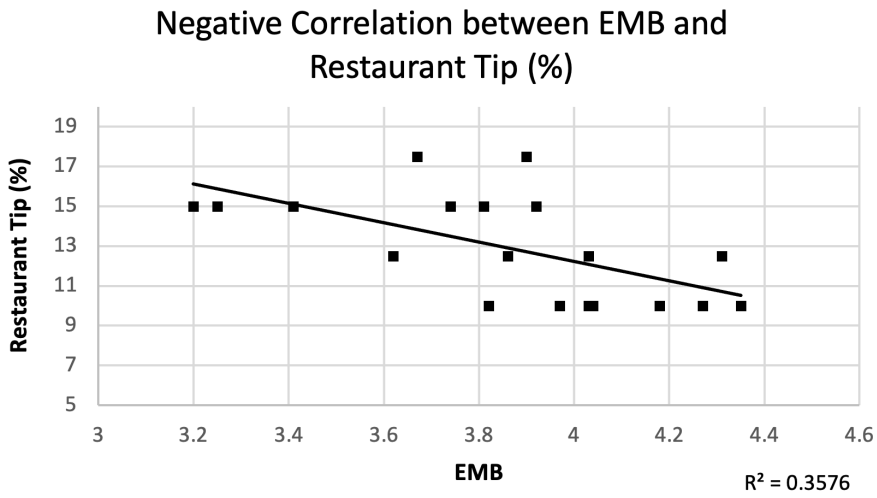


Figure 2. Correlation between EMB cultural index and restaurant tipping percentage.

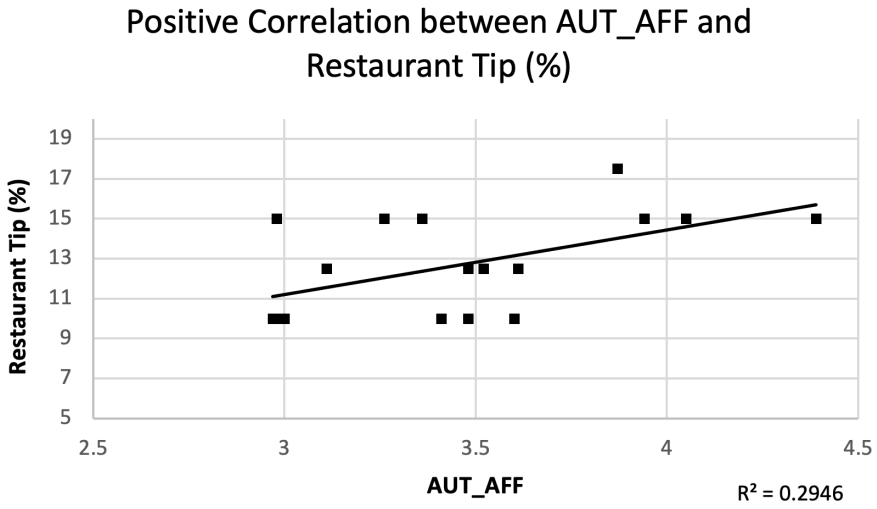


Figure 3. Correlation between AUT_AFF cultural index and restaurant tipping percentage.

Figure 4 shows a positive relationship between the AUT_INT index and the Restaurant Tip. The analysis likewise shows that $\frac{\mathrm{d}\lambda}{\mathrm{d}(\mathrm{AUT\_INT})} < 0$ and $\frac{\mathrm{d}\beta}{\mathrm{d}(\mathrm{AUT\_INT})} > 0$. Increases in the Intellectual Autonomy, AUT_INT, are associated with lower λ and higher β, and the correlation between AUT_INT and x^* is negative. This pattern corresponds to a less pronounced increase in tipping over time in societies with higher intellectual autonomy (Hypothesis H3 is mildly supported).

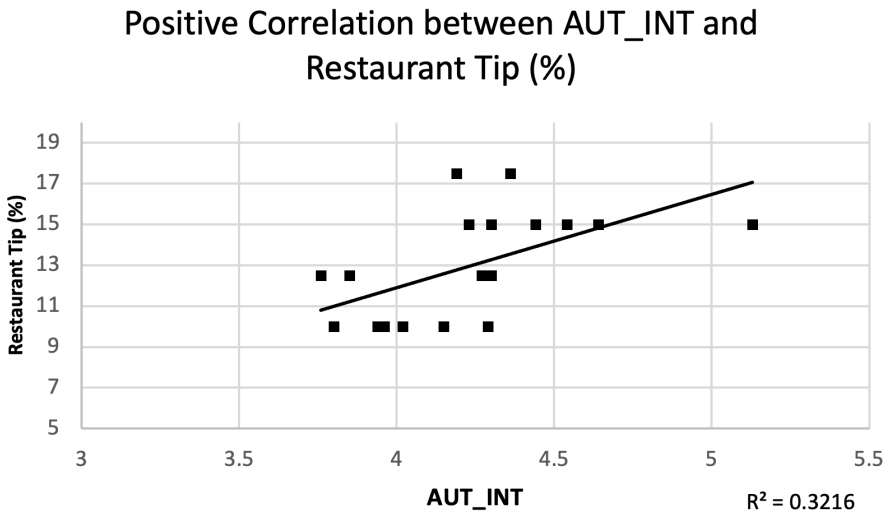


Figure 4. Correlation between AUT_INT cultural index and restaurant tipping percentage.

Figure 5 shows a positive relationship between the CTL_C index and the Restaurant Tip. With respect to the Cultural Tightness-Looseness Combination Index (CTL_C), results show $\frac{\mathrm{d}\lambda}{\mathrm{d}(\mathrm{CTL\_C})} < 0$ and $\frac{\mathrm{d}\beta}{\mathrm{d}(\mathrm{CTL\_C})} > 0$. Greater values of CTL_C are associated with lower λ and higher β. The analysis reveals a negative correlation between CTL_C and the tip deviation (x^*), such that higher cultural looseness is associated with lower tip inflation across periods (Hypothesis H4 is largely rejected).

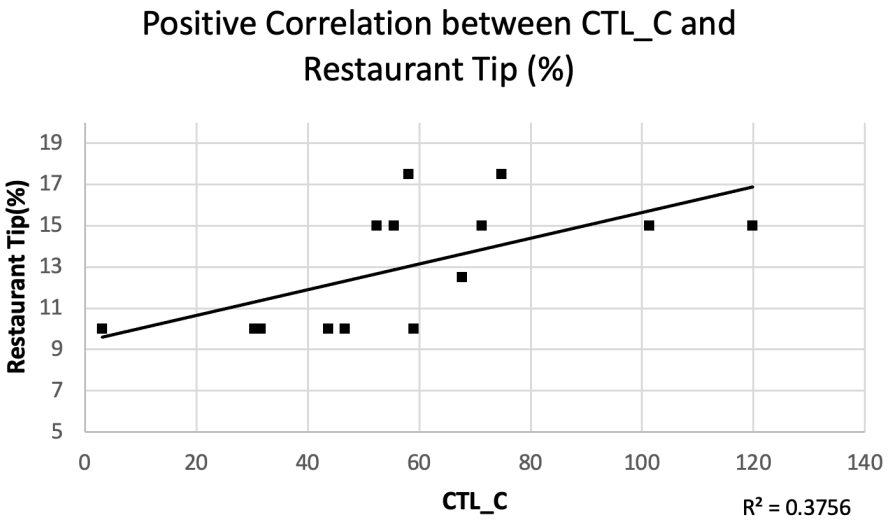


Figure 5. Correlation between CTL_C index and restaurant tipping percentage.

4.3. Qualitative Review

Amongst the four indices, Embeddedness (EMB) and Cultural Tightness (CTL_C) hold greater explanatory power (Higher R^2) for λ, β, and x^*. While correlations do not necessarily imply causation, this may highlight their greater involve-

ment in shaping the evolution of tipping norms when supported by qualitative research. In societies marked by both high Embeddedness and strong cultural tightness (low CTL_C), empirical evidence indicates both an increased displacement of the optimal tipping point from norm (high λ) and a higher rate of tip-inflation over time. These findings suggest that such societies foster collective behavioral mechanisms in which repeated acts of exceeding the prevailing norm incrementally raise the societal standard for tipping, generating a self-reinforcing cycle of norm escalation. This is consistent with theoretical predictions that, in conformity-driven environments, individuals accrue additional utility by tipping above the established norm, thereby shifting the reference point for the broader population, a claim primarily raised in the Azar theory and Proto theory (Azar, 2004b). The present analysis explicitly conditions this process on the presence of a conformity-driven environment, which was not specified in the previous theories.

Moreover, the observed reduction in sensitivity to norm deviation (lower β) also reflects a counterintuitive cultural dynamic, interestingly. This contradicts the common perception that a society with low tolerance for deviation is more likely to impose greater psychological cost on anyone who strays from the established tipping norm. Explaining this phenomenon may require further analysis of the factors driving each cultural index. In embedded cultures, individuals often perceive themselves as part of a close-knit collective (Brewer & Gardner, 1996), so a shared sense of belonging cushions minor departures from the norm, such that small under-tips are met with communal understanding rather than harsh judgment. Cultural Looseness is highly positively correlated with the violation of legal rules and laws (Uz, 2015). Thus, likewise, in tight societies, strict enforcement of formal rules (for example, mandatory service charges) may instead paradoxically lead to greater tolerance for minor deviations from informal tipping norms, if the correlation works reversibly and implies that the focus shifts to compliance with codified policy rather than personal discretion (Jackson, Gelfand, & De Merit, 2019). Under these conditions, it would thus be logical for the psychological-utility curve around the norm to be effectively flattened, not because people are more forgiving, but because minor nonconformity no longer registers as a breach of individual responsibility and therefore generates little additional "pain". Together, these qualitative reviews try to explain the correlation between the most pronounced tip-inflation effects observed in this set of cross-cultural data, substantiating the critical role of EMB and CTL_C as potential structural determinants of tipping behaviour and its temporal evolution.

5. Conclusion

5.1. Summary

This research builds upon the literature of the socio-economics of tipping by empirically validating and extending the recursive, norm-based theoretical framework first proposed by Azar (2004a, 2005). By explicitly modelling the dynamic

adjustment of tipping norms in response to both individual psychological utility and macro-level cultural indicators, the study has illustrated the critical role of culture in shaping the trajectory of tip inflation. The data supported 3 out of 4 hypotheses, and provided interesting observations, especially the correlation between tipping deviations (x^*) and Embeddedness (EMB), as well as the Combination Cultural Tightness-Looseness (CTL_C). While conventional intuition might predict that higher embeddedness and cultural tightness would produce greater social pressure to tip at or above the norm, thereby steepening the psychological utility curve (higher β), the results reveal a more nuanced dynamic. Instead, the empirical evidence and mathematical model jointly suggest that the influence of social tolerance and communal cohesion in highly embedded and tight cultures can, in certain respects, attenuate the psychological disutility associated with under-tipping (lower β). This implies that, even as conformity-driven environments drive up tipping norms through positive displacement (higher λ), the communal fabric may mitigate the "pain" of falling short, allowing both tip inflation and a degree of leniency toward norm deviation to coexist. This insight provides a new interpretive lens that bridges microeconomic behaviour, macro-level culture, and the empirical trajectory of social norms, offering a richer understanding than previously afforded by static or one-dimensional models.

5.2. Limitations and Implications for Compensation Policy

The prevailing social norm at time *k*, denoted *n*(s) in the original Azar's Customer Utility function, is proxied by the average tip given in the previous period in this model. This formulation assumes that consumers update their perception of the social norm based on observed tipping behaviour in the immediate past. While supported in U.S. contexts, its applicability across different cultural settings may be limited, given that norm internalisation and feedback mechanisms vary widely. Future work could further enhance the model's cross-cultural validity by incorporating independent survey-based measures of tipping norms and their evolution in other national environments. This would provide stronger empirical foundations for analysing how tipping expectations evolve within specific national contexts. Overall, these findings offer practical insights for businesses and policymakers in high-embeddedness or tight-norm cultures, where tipping expectations may escalate more sharply. Understanding the social and cultural influences on tipping behaviour can enable governments to more effectively evaluate whether tipping remains an appropriate form of compensation within their societies. In contexts where tipping norms are escalating due to cultural conformity pressures, alternative strategies, such as implementing standardised service charges or mandating greater transparency in compensation structures, may help mitigate wage inequality and reduce reliance on informal tipping practices.

5.3. Future Research Directions

Several promising avenues for interesting future research may arise from this study.

First, the impact of political cycles, such as the four-year U.S. presidential election cycle, on national culture and social behaviour presents a fertile ground for exploration. It remains an open question whether such macro-political fluctuations may induce observable changes in tipping behaviour and norm adaptation, potentially through shifts in national mood, uncertainty, or societal values.

Second, the potential for government intervention to modulate tipping inflation through cultural policy or social norm campaigns warrants rigorous empirical examination. Targeted efforts to foster inclusivity, reduce status anxiety, or reshape perceptions of service could have significant downstream effects on both the level and distribution of tipping in society.

Third, the rapid integration of automation and artificial intelligence into hospitality and service industries presents a structural challenge to the traditional cultural drivers of tipping. As human interaction is supplanted by algorithmic service provision, the salience of cultural factors in tipping decisions may diminish, potentially leading to new equilibria where economic rationality and technological design dominate over social norm adherence.

Finally, future work could broaden the analytical framework developed here to examine other settings where economic outcomes are closely entwined with dynamic social norms, including charitable giving, peer-to-peer transactions, and digital economies. Longitudinal studies, experimental interventions, and international panel data analysis would all serve to deepen our understanding of how culture, psychology, and technology co-evolve to shape prosocial economic behaviour over time.

In summary, this research contributes to a robust platform for analysing the complex interplay between individual psychology, cultural context, and economic behaviour. It provides a theoretical explanation for tipping norm inflation, grounded in individual psychology and social conformity, and connects that explanation to measurable cultural traits. These findings are also noteworthy in that they extend beyond tipping itself, revealing that small changes in cultural norms, as captured by different indices, can lead to significantly different behavioural outcomes.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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Appendices

Appendix 1

Table A1. Notation and variable definitions.

Symbol	Definition
k	Discrete time index (in Years)
t_k	Choice of tip rate at the time k
t_k^*	Tip rate at equilibrium (Maximum total utility) at time k
t_{k-1}^*	Prior period's optimal tip rate, also known as the social norm (average tip rate at the time $k-1$)
x	Deviation t_k from social norm ($x = t_k - t_{k-1}$)
x^*	Deviation t_k^* from the social norm ($x^* = t_k^* - t_{k-1}^*$)
b	Bill size
s	Service quality
β	Norm-steepness parameter
λ	Horizontal shift of psychological-utility peak
γ	Asymmetry factor $\gamma > 1$: Penalises under-tipping more than over-tipping
$U\left(t_k, t_{k-1}^*, b, s\right)$	Total consumer/customer utility at time k
$-d\left(b, t_k\right)$	Monetary disutility function
$f\left(x;\beta,\lambda,\gamma\right)$	Psychological utility function
$G\left(s,b\right)$	Exogenous service-enjoyment utility

Appendix 2

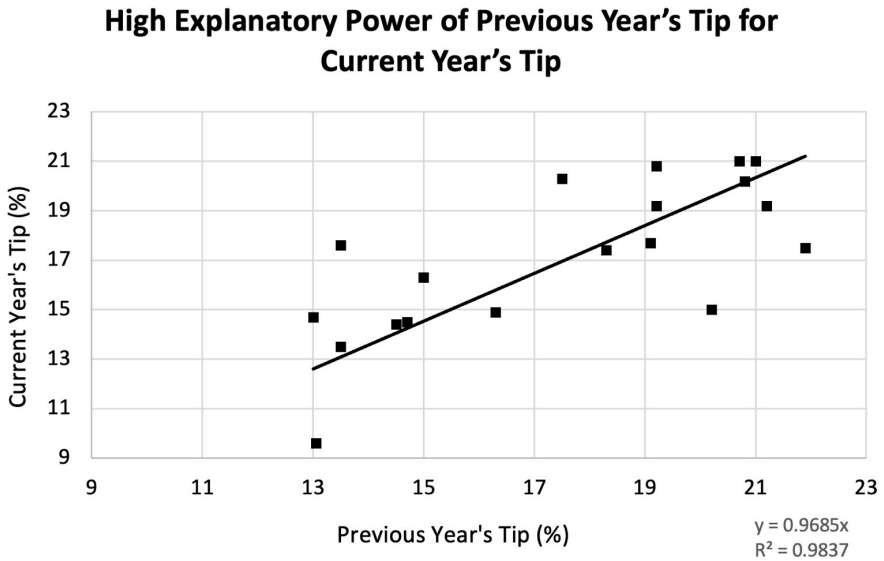

Figure A1. Relationship between current and previous year tipping rates using OLS regression.

Table A2. Average United States' tip, 1977 to 2022.

Year	Mean Percentage Tip in the U.S.	Year	Mean Percentage Tip in the U.S.	Year	Mean Percentage Tip in the U.S.	Year	Mean Percentage Tip in the U.S.
1977	9.600000381	1995	18.29999924	2001	20.79999924	2014	21
1978	13.05000019	1997	14.89999962	2002	19.20000076	2015	20.70000076
1980	16.5	1998	16.29999924	2003	19.20000076	2017	20.10000038
1982	14.39999962	1999	15	2004	21.20000076	2022	21.79999924
1983	14.5	2000	20.20000076	2006	17.70000076		
1984	14.69999981	1994	17.39999962	2007	19.10000038		
1985	13	1995	18.29999924	2009	20.29999924		
1990	17.60000038	1997	14.89999962	2010	17.5		
1991	13.5	1998	16.29999924	2011	21.89999962		
1994	17.39999962	1999	15	2013	21		

Appendix 3

Table A3. Cultural dimension scores and restaurant tipping rates by country.

Country	EMB	AUT_AFF	AUT_INT	CTL_C	Restaurant Tip (%)
Belgium	3.25	3.94	4.64	119.8	15
Brazil	3.62	3.52	4.27	-	12.5
Colombia	3.86	3.61	4.3	-	12.5
Estonia	3.81	3.36	4.23	55.4	15
France	3.2	4.39	5.13	101.3	15
India	3.97	3.48	4.02	43.7	10
Indonesia	4.27	3.41	3.94	3.1	10
Iran	4.18	2.97	3.96	31.5	10
Ireland	3.41	4.05	4.54	71.2	15
Malaysia	4.35	2.98	4.15	-	10
Mexico**	3.9	2.83	4.36	74.7	17.5
Pakistan	4.31	3.11	3.76	-	12.5
Peru	3.92	2.98	4.3	52.3	15
Philippines	4.03	3	3.95	46.6	10
Slovakia	3.82	2.99	4.29	59	10
Slovenia*	3.71	3.72	4.88	55.1	3
South Africa	4.03	3.48	3.85	67.6	12.5
Spain*	3.31	3.67	4.99	83.9	7.5
United states of America	3.67	3.87	4.19	58	17.5
Venezuela	3.74	3.26	4.44	-	15
Zimbabwe	4.04	3.6	3.8	30.4	10
Number of Countries					**21**

*Represents a general outlier for cultural indicators against the Restaurant Tip; **Represents an outlier for AUT_AFF against the Restaurant Tip (Data is consolidated from various reliable sources).

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