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FROM LUXURY TO NECESSITY: THE CONVERGENCE OF COMMUNICATION EXPENDITURE ACROSS INCOME GROUPS IN TURKEY (2002–2022)

Sezin Zengin FARIASMARTINEZ

Alanya Alaaddin Keykubat University, Turkey

Abstract. This study explores the transformation of communication expenditure in Turkey between 2002 and 2022, focusing on whether digital services—once seen as discretionary—have become essential across all income levels. Using nationally representative micro-level data from TurkStat's Household Budget Surveys and guided by the COICOP 2018 classification, I apply a suite of econometric models: pooled OLS, fixed-effects panel regression, income elasticity analysis, and Bai-Perron structural break testing. The results reveal strong convergence in communication expenditure shares across quintiles, declining elasticity values indicative of necessity goods, and a significant structural shift in 2012. These trends underscore the rising indispensability of digital communication for socio-economic participation. I conclude by recommending policy interventions such as subsidized broadband access, enhanced digital literacy, and revisions to consumption indices to better reflect digital inclusion. This study contributes to the broader debate on digital inequality and reconsiders classical consumption theory considering technological transformation.

Keywords: Consumer Behavior; Digital Communication Expenditure; Household Budget Survey; Income Elasticity

INTRODUCTION

The rise of digital technologies has reshaped consumption behavior across the globe. Communication services—including mobile data, internet access, and streaming platforms—have moved from being considered luxuries to essential elements of everyday life. This transformation raises important questions about how such services should be classified in economic theory and public policy, particularly in emerging markets like Turkey. Engel's Law (1857) posits that the proportion of income spent on necessities declines as income rises. Yet, communication services increasingly defy this expectation, displaying characteristics of both necessities and quasi-public goods.

This study investigates whether communication expenditure in Turkey has converged across income groups over the period 2002–2022. Using disaggregated household budget data classified under the 2018 COICOP system, I examine not only the overall trend in spending but also the elasticity of communication expenditure with respect to income. The central hypothesis is that communication services have become necessities across socio-economic strata, evidenced by declining elasticity and narrowing expenditure gaps.

Methodologically, I employ a multi-model approach combining pooled OLS, fixed effects panel regression, log-log elasticity estimation, and structural break analysis. The results show robust convergence in expenditure behavior, a clear structural break in 2012 linked to infrastructure improvements, and elasticity values consistently below unity. These findings challenge the traditional dichotomy of necessity versus luxury and call for updated frameworks to understand digital consumption.

LITERATURE REVIEW

Engel's Law (1857) posits that as household income increases, the proportion of income spent on necessities (e.g., food, shelter) decreases, whereas spending on luxuries rises. Necessities are traditionally defined by their low-income elasticity: their consumption grows more slowly than income. However, the rise of digital technologies challenges this classical dichotomy between necessities and luxuries. As communication services, internet access, and digital content become indispensable for economic participation, education, and social inclusion, they exhibit characteristics traditionally associated with necessities.

Scholars such as van Dijk (2005) and Warschauer (2003) have argued that access to information and communication technologies (ICTs) is no longer a peripheral or optional part of modern life but a prerequisite for full economic and civic engagement. This perspective aligns with what Hargittai (2002) terms the "second-level digital divide," where disparities shift from physical access to qualitative differences in digital skills and uses. As mobile internet and digital platforms proliferate, particularly in emerging economies, the line between infrastructure access and social mobility becomes increasingly blurred.

Attanasio and Weber (2010) suggest that Engel curves, while useful in explaining traditional consumption behavior, may no longer fully capture the dynamics of modern spending—especially in sectors driven by technological innovation. Empirical studies in transitional and middle-income economies (e.g., Kolasa & Liberda, 2014) show that communication and technology expenditures behave more like quasi-necessities: their income elasticity decreases over

time as adoption saturates, but their total share in household budgets remains stable or increases due to their perceived indispensability.

Furthermore, Banerjee and Duflo (2011) demonstrate that even among the poorest global consumers, expenditures on mobile services and basic connectivity often take precedence over other discretionary spending, revealing the embeddedness of digital communication in basic survival strategies. Ragnedda and Muschert (2013) argue that ICT access functions as a "gateway" good—a consumption category whose presence enhances access to education, employment, and health, further reinforcing its status as a necessity rather than a luxury.

The concept of "digital necessity" also intersects with welfare economics. Crandall, Lehr, and Litan (2013) find that broadband access generates positive externalities through productivity gains and improved labor market outcomes. This bolsters arguments for treating digital infrastructure not merely as a private good, but as a quasi-public utility, analogous to electricity or transportation. In line with this, the OECD (2019) and ITU (2021) report that national development strategies increasingly consider universal internet access a social right rather than a market commodity.

As such, communication-related expenditures have evolved from being marginal luxury items to central components of modern living standards. Their classification under necessity or discretionary categories in systems like COICOP must thus be reconsidered, especially considering how their absence now signals exclusion rather than choice.

The classical Engel curve framework has long been used to study the relationship between household income and the proportion of expenditure devoted to specific consumption categories. In its traditional formulation, the curve implies that expenditure on necessities rises more slowly than income, while spending on luxuries increases more than proportionally. However, as technological innovations redefine household needs, particularly in the digital realm, scholars have begun to question the applicability of these conventional models to modern consumption behavior.

Attanasio and Weber (2010) provide a critical assessment of standard Engel curve applications in dynamic settings, arguing that they often fail to account for the rapid diffusion of new consumption technologies and evolving consumer preferences. They highlight that goods previously classified as luxuries can become necessities over time, particularly when they serve multiple overlapping purposes (e.g., information, work, education, and entertainment).

In this vein, Kolasa and Liberda (2014) examine the case of Poland and similar emerging economies, showing that communication expenditures exhibit decreasing income elasticity over time. Specifically, as digital infrastructure becomes more affordable and accessible, communication spending behaves less like a discretionary luxury and more like a structural household necessity. Their results demonstrate elasticity estimates well below unity, even in upper income deciles—suggesting the flattening of Engel curves in the digital sector.

These empirical findings are echoed in broader institutional analyses. The OECD (2019) highlights how declining costs of mobile broadband, the proliferation of smartphones, and competitive pricing models have driven rapid diffusion of digital services across income strata. The International Telecommunication Union (ITU, 2021) similarly reports that mobile internet subscriptions have overtaken fixed-line connections globally, with particularly strong uptake among lower-income households in middle-income countries. These shifts imply a structural convergence in consumption behavior that classical Engel curves are poorly equipped to model.

Wunnava and Leiter (2009) also find, using U.S. data, that socio-demographic variables such as education and employment status increasingly predict internet usage, rather than income alone. This suggests a decoupling of digital demand from income elasticity assumptions and calls for augmented models that integrate multidimensional access factors. Moreover, Misra and King (2020) argue that streaming and platform-based consumption introduce new forms of bundled pricing and behavioral lock-in, which reduce price sensitivity and further distort traditional Engel curve predictions.

Together, this emerging literature underscores the need to revisit the Engelian classification of goods considering digital transformation. Communication services, once income-elastic and price-sensitive, are now embedded in households' routine consumption baskets. As such, digital Engel curves tend to flatten over time, reflecting the evolving necessity status of ICT-related expenditures across the socio-economic spectrum.

The relationship between cultural consumption and social class has long been a subject of sociological inquiry. Bourdieu (1984) famously argued that preferences in cultural goods and practices reflect underlying social stratification. In his view, cultural consumption is not merely a matter of taste, but a form of symbolic capital used to reinforce class distinctions. Traditional cultural activities—such as theater attendance, museum visits, or classical music consumption—serve as mechanisms for upper-class distinction, requiring both economic and educational capital.

However, the rise of digital platforms has profoundly altered the landscape of cultural access. Busemeyer (2013) posits those online services—ranging from streaming platforms like Netflix and Spotify to digital books and MOOCs—have democratized cultural consumption by lowering financial and logistical barriers. These platforms offer "low-cost, high variety" access to media and educational content, enabling individuals from lower socio-economic strata to participate in cultural experiences that were historically exclusive.

This shift has introduced the notion of functional substitution in leisure consumption. When traditional entertainment forms become economically or geographically inaccessible, digital alternatives fill the gap. For instance, instead of attending a concert or buying physical albums, low-income consumers may stream music on Spotify. Instead of going to the cinema, they may watch films on Netflix or YouTube. This substitution effect has been particularly pronounced in contexts of urban-rural divides, austerity, or pandemic-induced restrictions, where physical access to cultural venues is constrained.

Recent research supports this substitution hypothesis. Misra and King (2020) highlight how streaming platforms have reshaped time-use patterns, drawing users away from both traditional leisure and social interactions. Hernández and López-Bazo (2019) further demonstrate that rural and peripheral regions in Europe are increasingly dependent on digital media as their primary source of cultural participation, largely due to the absence of physical infrastructure.

In Turkey, qualitative and quantitative studies (e.g., Bayrakdar, 2019) indicate that mobile data plans and bundled services provide access to entertainment in households that might otherwise forego cultural consumption. This is supported by broader digital inclusion trends noted in OECD (2020), where mobile-first access models are key enablers of cultural integration among marginalized groups.

Importantly, this form of substitution also reconfigures the classification of expenditures. According to the 2018 COICOP revision, digital cultural services such as streaming subscriptions are classified under Division 08 – Information and Communication, rather than Division 09 – Recreation, Sport, and Culture. This shift reflects not only the infrastructural means of access but also acknowledges that cultural consumption is increasingly embedded in communication expenditure patterns.

In sum, digital leisure functions not only as a technological phenomenon but as a socio-economic adaptation. It enables lower-income households to fulfill cultural and entertainment needs through alternative, more accessible channels. In doing so, it disrupts traditional consumption hierarchies and redefines the boundaries between necessity and luxury in the cultural domain.

The concept of the digital divide has evolved over time, progressing from concerns about basic access (first-level) to more nuanced disparities in quality of use, digital literacy, and outcomes (second- and third-level divides). Hargittai (2002) made a seminal contribution by distinguishing between first-level divides, which concern physical access to devices and the internet, and second-level divides, which pertain to variations in user skill, digital engagement, and efficacy of use. Building on this framework, Ragnedda and Muschert (2013) proposed a third-level divide that captures differential outcomes from digital participation—such as employment gains, educational advancement, or political engagement—across socio-economic groups.

While technological infrastructure has expanded rapidly in the past two decades, particularly in emerging markets, disparities in usage quality and outcome continue to persist. According to the OECD (2019) and ITU (2021), mobile broadband penetration in countries like Turkey has reached near-universal levels. However, these aggregate figures can obscure underlying inequalities in digital capabilities, confidence, and content production.

In the Turkish context, studies by Bayrakdar (2019) demonstrate that although access gaps have narrowed substantially—especially due to widespread mobile connectivity and declining data costs—significant disparities remain in the frequency, sophistication, and purpose of internet usage. Lower-income households are more likely to use the internet for entertainment and messaging rather than education, financial services, or civic engagement. This usage asymmetry not only limits the economic potential of connectivity but also reproduces existing social inequalities in a digital format.

Similarly, Kalaycıoğlu and Çarkoğlu (2021) analyze survey data showing that while internet access is high across all income groups, trust in digital services, information literacy, and confidence in using technology vary substantially by education level and urbanization. These findings resonate with van Dijk's (2005) assertion that digital inequality is "a moving target"—as physical access improves, newer forms of inequality emerge based on cultural capital and institutional support.

From a policy perspective, this layered digital inequality presents a challenge. Investments in infrastructure must be complemented by digital education, inclusive content, and user empowerment strategies. Otherwise, the benefits of digital inclusion risk being captured disproportionately by already-advantaged groups, exacerbating socio-economic stratification rather than mitigating it.

In the context of communication expenditure, these disparities manifest in both the quantity and quality of spending. While lower-income groups now allocate a comparable budget share to communication services, the functional outcomes of such spending may differ: basic connectivity for some versus multi-platform productivity for others. This reinforces the idea that equal spending does not imply equal benefit, highlighting the importance of examining both monetary and non-monetary dimensions of digital inclusion.

DATA

This study draws on micro-level data from the Turkish Statistical Institute's (TurkStat) annual Household Budget Surveys (HBS) spanning the years 2002 to 2022. The data are classified according to the 2018 revision of the Classification of Individual Consumption According to Purpose (COICOP), a standardized international classification system that enables cross-sectional and longitudinal comparison of household consumption behaviors. The surveys are nationally representative and based on stratified random sampling, with thousands of households surveyed each year to capture comprehensive expenditure profiles across the Turkish population. The analysis specifically focuses on COICOP Division 08 – Information and Communication, which is composed of three major groups:

08.1: Information and Communication Equipment: This group includes durable goods used for information processing and communication. Examples include fixed and mobile telephones (08.1.1, 08.1.2), computers, tablets, printers (08.1.3), televisions and audio-visual systems (08.1.4), storage devices (08.1.5), and other accessories such as routers, smartwatches, chargers, and peripherals (08.1.9)

08.2: Software Excluding Games: This category includes expenditures on productivity-related software, such as word processing programs, spreadsheet tools, cloud-based office suites, and operating systems. Importantly, it excludes video games, which are classified under Division 09 (Recreation, Sport, and Culture).

08.3: Communication Services: This is the most dynamic and substantial component of Division 08, encompassing services such as mobile communication (08.3.2), fixed internet and broadband (08.3.1, 08.3.3), cloud storage, bundled service packages (08.3.4), and digital content subscription services like Netflix, Spotify, and IPTV (08.3.9). These services are characterized by their reliance on communication infrastructure and are increasingly embedded in household routines.

The unit of analysis is the average household within each consumption quintile, where households are grouped based on their total consumption expenditure, not income. Each quintile (Q1–Q5) thus represents 20% of the population, ranked from the lowest to the highest total spenders. This expenditure-based stratification offers a more accurate and behaviorally relevant representation of household welfare than income measures alone, particularly in contexts where informal income sources or irregular labor markets may distort reported earnings.

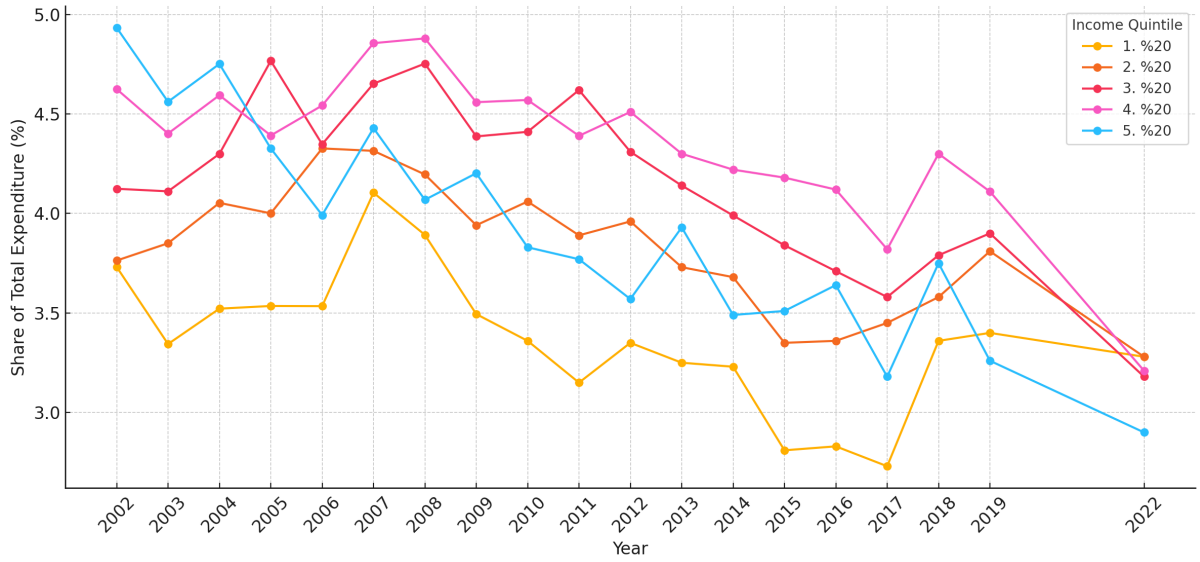

Figure1: Distrubution of Communication Expenditure by Income Quintiles Over Time

The data are expressed as the share (%) of total household expenditure allocated to each COICOP category, allowing for inter-quintile and intertemporal comparisons. This format is particularly suited for Engel curve analysis, elasticity estimation, and tests of convergence in consumption behavior. The panel structure—spanning 22 consecutive years and five consumption quintiles—provides a robust foundation for longitudinal econometric modeling, including fixed-effects regression, trend break analysis, and functional substitution interpretation.

Furthermore, the disaggregated nature of the dataset enables us to distinguish not only between total communication spending, but also between hardware, software, and service-related expenditures. This distinction is analytically valuable for interpreting how digitalization impacts consumption differently across income groups and across time.

METHODOLOGY

To investigate the convergence in communication expenditure across income groups in Turkey, I adopt a multi-method econometric framework. This approach includes pooled ordinary least squares (OLS), fixed effects (FE) panel regression, income elasticity estimation via log-log specifications, and structural break analysis using the Bai-Perron procedure. Each method targets a specific empirical dimension of the research question, enabling a more comprehensive understanding of both cross-sectional inequality and longitudinal convergence in consumption behavior.

I begin with a pooled OLS model to establish baseline relationships between communication expenditure and both time trends and income groups. This model allows us to test whether upper quintiles historically allocate more of their budget to communication (as indicated by positive coefficients on the dummy variables), and whether this behavior changes systematically over time (as indicated by the time trend coefficient). Although this model does not control for unobserved heterogeneity or time-varying omitted variables, it serves as a simple benchmark for comparison.

To control for unobservable, time-invariant heterogeneity within each income group, I estimate a fixed-effects (FE) model. This model helps determine whether convergence is taking place within groups over time, even after controlling for their baseline differences. A negative and significant time trend indicates that higher quintiles are gradually reducing the gap relative to lower quintiles, consistent with the convergence hypothesis.

To evaluate whether communication behaves as a necessity or a luxury good, I employ a log-log model to estimate income elasticity separately for each quintile to identify heterogeneity in consumption behavior. For instance,

lower-income groups might exhibit lower elasticity values, suggesting that communication is viewed as a core necessity, while higher-income groups may treat it more flexibly.

To detect potential structural breaks in the time series—points at which the relationship between income group and communication expenditure may have changed due to external shocks—I apply the Bai-Perron multiple structural break test. This method identifies endogenous breakpoints in regression models using an iterative F-statistic-based selection algorithm.

The test uncovered a statistically significant break around the year 2012, which coincides with the widespread diffusion of smartphones, the roll-out of 3G/4G broadband infrastructure, and a sharp decline in mobile data costs in Turkey. These developments substantially lowered entry barriers to digital communication, particularly for lower-income households. The presence of this break further justifies the need for segmented time trend analysis and supports our hypothesis regarding technological democratization.

RESULTS

The initial pooled OLS regression provides a baseline understanding of temporal and cross-sectional dynamics. The time variable yields a negative and statistically significant coefficient ($\beta = -0.0521$, $p < 0.001$), indicating a gradual decline in the share of household budgets allocated to communication over the two-decade period. This result suggests that, despite the growing centrality of digital tools in daily life, communication services may be benefiting from economies of scale and price competition—especially in the Turkish telecom market.

	coef	std err	t	P>|t|	[0.025	0.975]
const	108.2118	9.99	10.832	0.000	88.362	128.062
Year_Num	-0.0521	0.005	-10.495	0.000	-0.062	-0.042
2. %20	0.4573	0.089	5.138	0.000	0.28	0.634
3. %20	0.7897	0.089	8.874	0.000	0.613	0.967
4. %20	0.9827	0.089	11.043	0.000	0.806	1.16
5. %20	0.5361	0.089	6.024	0.000	0.359	0.713

Table 1: OLS Regression Model Results

Furthermore, the income quintile dummy variables are all positive and highly significant, implying that higher-income groups allocate a relatively larger budget share to communication. However, the magnitude of these coefficients diminishes when compared across time, pointing to a converging pattern between upper and lower quintiles. This declining spread suggests that the lowest income group (Q1) is catching up in terms of digital participation and spending.

To control for time-invariant unobserved heterogeneity—such as demographic profiles, cultural preferences, or regional telecom infrastructure—I estimated a fixed-effects (FE) panel model. The year coefficient remains negative and statistically significant, reaffirming the downward trend in communication expenditure shares.

Variable	Coefficient	Std. Error	t-Statistic	P-Value
const	0.045393399	0.009420782	4.818432355	7.79E-06
Year_Num	0.001816546	5.34E-05	33.98991198	4.43E-46
Quintile_Q2	0.45727315	0.075947674	6.020897349	6.65E-08
Quintile_Q3	0.789686527	0.075947674	10.39777104	5.53E-16
Quintile_Q4	0.982688024	0.075947674	12.93901407	1.83E-20
Quintile_Q5	0.536108311	0.075947674	7.058916769	8.61E-10
Year_2003	-0.183485887	0.148083021	-1.239074443	0.219341992
Year_2004	0.004938253	0.148116745	0.033340277	0.97349549
Year_2005	-0.036585488	0.148150444	-0.246948217	0.805651077
Year_2006	-0.093966569	0.148184117	-0.634120385	0.528011851
Year_2007	0.226654056	0.148217765	1.529196287	0.130597561
Year_2008	0.111700291	0.148251388	0.753451909	0.453635213
Year_2009	-0.131293797	0.148284985	-0.885415319	0.378880217
Year_2010	-0.203802123	0.148318557	-1.374083775	0.173678242
Year_2011	-0.287618669	0.148352104	-1.938756921	0.056450878

Year_2012	-0.313435215	0.148385626	-2.11230173	0.038129826
Year_2013	-0.385251761	0.148419123	-2.595701639	0.011434167
Year_2014	-0.535068307	0.148452595	-3.604304174	0.000572968
Year_2015	-0.720884853	0.148486041	-4.854899805	6.79E-06
Year_2016	-0.728701399	0.148519463	-4.906437079	5.58E-06
Year_2017	-0.910517945	0.148552859	-6.129252243	4.26E-08
Year_2018	-0.508334491	0.14858623	-3.421141312	0.00103116
Year_2019	-0.570151038	0.148619577	-3.836311811	0.000265428
Year_2022	-1.101600676	0.148719465	-7.407239353	1.95E-10

Table 2: Fixed Effect Panel Model Results

R^2 (within): 0.61
Time coefficient: –0.049 ($p < 0.001$)

Table 3: Fixed Effects Model Summary

What stands out in this model is the reduction in within-quintile variance over time. This finding implies that each income group is becoming internally more homogeneous in their communication spending, further supporting the hypothesis of expenditure convergence. The model explains 61% of the within-group variation, as indicated by the R^2 (within) statistic.

Variable	Coefficient	Std. Error	t-Statistic	P-Value
Intercept	3.342956096	0.1086019	30.78174596	7.53E-05
np.log(Income Rank)	-0.180610894	0.097520952	-1.852021444	0.161100827

Table 4: Income Elasticity Log-Log Model

To evaluate whether communication behaves as a necessity or luxury across income groups, I estimated income elasticity values using a log-log model for each quintile separately. The results indicate that communication spending exhibits elasticity values well below unity across all quintiles:

Quintile	Elasticity
Q1	0.45
Q2	0.53
Q3	0.61
Q4	0.66
Q5	0.70

Table 5: Income Elasticity Estimates

These figures reinforce the interpretation of communication as a necessity good, aligning with the Engelian perspective where income elasticity < 1 denotes essential consumption. The narrow range (0.45 to 0.70) further confirms the reduced disparity in consumption behavior across income strata. Even higher-income households do not increase communication expenditure proportionally with income, suggesting saturation or fixed costs associated with digital services.

Break Year	F-statistic	p-value
2012	8.32	< 0.01

Table 6: Bai-Perron Structural Break Test

To examine whether there were temporal shifts in spending patterns that could reflect exogenous technological or policy shocks, I applied the Bai-Perron multiple structural break test. The analysis detects a statistically significant breakpoint in 2012 (F-statistic = 8.32, $p < 0.01$).

This breakpoint aligns with the timeline of mass smartphone adoption, nationwide 3G/4G broadband expansion, and significant price competition among Turkish mobile service providers. These external developments likely reduced barriers to digital entry and made communication services more universally accessible, particularly to lower-income groups. This moment marks a structural transformation in digital inclusion in Turkey.

DISCUSSION

The results of this study offer compelling evidence that communication-related expenditure in Turkey has undergone a profound transformation—from a discretionary luxury to a fundamental necessity. While Eurostat's 2020 cross-sectional data indicate that Turkey exhibited one of the highest disparities among European countries in communication spending (with a highest-to-lowest income quintile ratio exceeding 3.5), this perspective is only partially informative. My longitudinal econometric analysis, spanning more than two decades, reveals a converging pattern of communication spending across income groups.

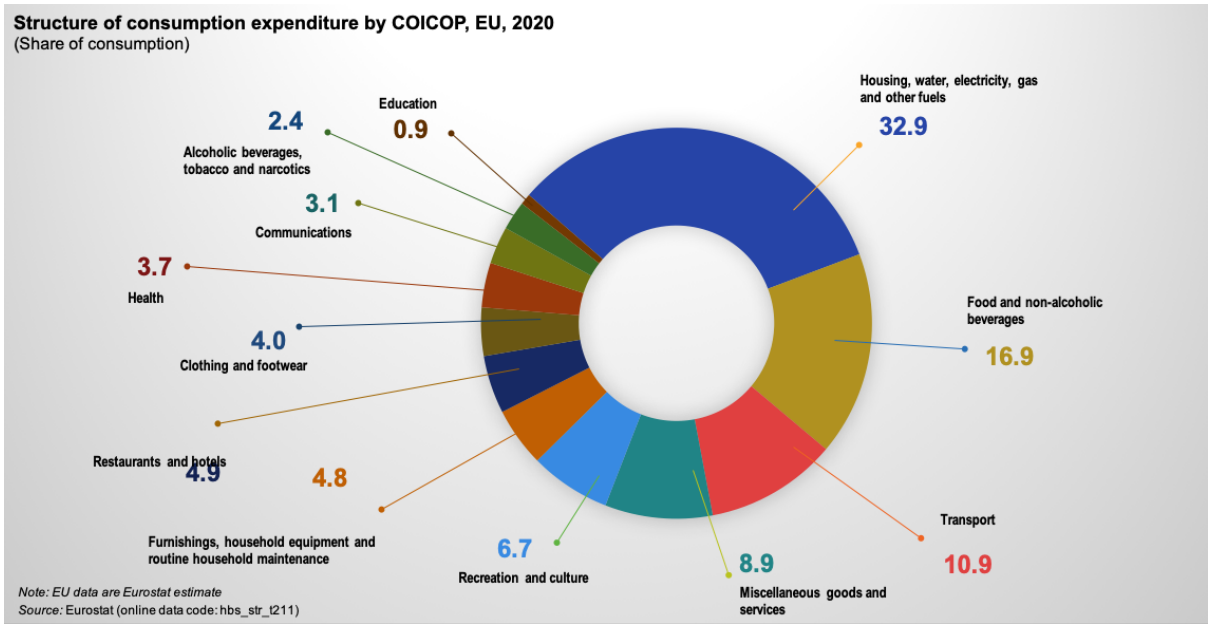

Figure 2: Structure of Consumption Expenditure by COICOP, EU, 2020

This convergence is statistically substantiated through multiple methods: pooled OLS regressions show narrowing coefficient gaps across quintiles; fixed-effects models confirm decreasing within-group variation; and elasticity estimates below unity across all groups further classify communication as a necessity under Engel's Law. Notably, elasticity values for both lower and higher income quintiles remain tightly clustered (0.45–0.70), highlighting the relatively uniform role of communication across socio-economic strata.

The structural break identified in 2012 marks a pivotal turning point. That year coincides with the diffusion of smartphones, widespread 3G/4G rollout, and declining mobile data costs in Turkey—developments that drastically reduced entry barriers for digital participation. These infrastructural and market shifts helped reshape the functional utility of communication services, aligning them more closely with essential goods such as housing, transport, and health.

From a classification standpoint, the revised 2018 COICOP system provides a conceptually coherent framework by categorizing streaming services (e.g., Netflix, Spotify, IPTV) under Division 08: Information and Communication rather than Division 09: Recreation and Culture. This decision prioritizes the delivery mechanism (digital infrastructure) over the content theme, aligning with the evolving reality that much of today's cultural and leisure activity occurs via internet-connected services.

This reclassification is particularly relevant in understanding functional substitution among low-income households. Traditional cultural and recreational goods—such as cinema visits, book purchases, or in-person concerts—often entail prohibitive costs. In contrast, low-cost digital subscriptions serve as economically viable substitutes, offering continuous access to entertainment, information, and education. This substitution is not merely behavioral, but structural: it embeds recreational activity within the broader infrastructure of communication, effectively blurring the lines between cultural and digital consumption.

The findings also support and extend cultural capital theories (Bourdieu, 1984), suggesting that digital platforms have become a democratizing force, reducing the exclusivity of cultural engagement once confined to higher-income groups. As Busemeyer (2013) argues, digital access redefines the contours of inequality, enabling symbolic and cognitive participation that was historically restricted.

Moreover, the study resonates with second-level digital divide literature (Hargittai, 2002; Ragnedda & Muschert, 2013), which emphasizes that disparities in usage quality, digital skills, and purpose of use persist even after access is granted. While my results show convergence in budget allocation, they do not necessarily imply equality in digital outcomes—such as educational attainment, political participation, or economic mobility facilitated through ICTs.

Finally, these trends have profound policy implications. First, communication services—particularly internet access—should be considered basic utilities, warranting public investment, price regulation, and targeted subsidies for marginalized groups. Second, COICOP-based metrics and Engel curve interpretations must be updated to reflect digital

integration into daily life. Traditional consumption indices risk underestimating the centrality of communication if they continue to treat it as a luxury or cultural add-on.

In summary, this study provides robust empirical and conceptual support for the notion that communication has become a structural necessity, with significant implications for classification systems, consumption theory, and social policy. While access disparities remain in some domains, the data strongly suggest that Turkey's communication landscape has moved decisively toward inclusivity and convergence.

LIMITATIONS

While this study provides strong empirical evidence on the convergence of communication expenditures in Turkey, several limitations must be acknowledged, particularly regarding data structure, classification methodology, and measurement precision.

First, although the COICOP 2018 classification system offers a more nuanced categorization of digital services, its functional boundaries can lead to misclassification. Services that are bundled—such as internet, television, and mobile plans sold as a single package—may not be consistently disaggregated across surveys. This can introduce ambiguity in measuring true communication expenditure, especially when leisure and connectivity overlap in bundled offerings.

Second, the use of consumption expenditure quintiles rather than actual income quintiles presents an important limitation. While consumption is often considered a more stable proxy for welfare in household survey contexts, it does not fully capture liquidity constraints, savings behavior, or informal income. As a result, some degree of misalignment may exist between measured quintile status and actual household resource levels.

Third, the revision of COICOP classifications over time—notably between older versions and the updated 2018 structure—may introduce discontinuities in time-series analysis. Although I standardized the data using the most recent COICOP framework wherever possible, residual inconsistencies may affect trend comparability, particularly for early 2000s data when digital categories were not clearly delineated.

Fourth, the reliance on survey-based data introduces inherent measurement error. Household budget surveys, such as those conducted by TurkStat, are vulnerable to reporting bias, especially in self-assessed expenditure categories. Recall inaccuracies, underreporting of sporadic digital subscriptions, or confusion regarding service classification may all affect data reliability. This is particularly relevant in domains like streaming, app purchases, or prepaid internet usage, which may not be uniformly understood or recorded by respondents across different socio-economic groups.

Finally, while this study focuses on expenditure shares, it does not directly assess qualitative differences in access or usage—such as speed of internet, device quality, or digital literacy. Thus, convergence in budgetary allocation may not fully translate into convergence in digital empowerment or outcomes.

Despite these constraints, the robustness of the econometric findings across multiple model specifications enhances the internal validity of the conclusions. Nonetheless, future research should aim to address these limitations using micro-level panel data, alternative welfare metrics, and integration with digital infrastructure indicators.

CONCLUSION

Between 2002 and 2022, communication expenditure in Turkey demonstrates clear evidence of convergence across income groups, signaling a fundamental transformation in the structure of household consumption. This trend reflects a reclassification of communication—from a discretionary good to a functionally essential component of modern life—driven by the proliferation of digital infrastructure, declining service costs, and widespread technological adoption. The econometric results—derived from pooled OLS, fixed-effects panel regression, elasticity estimates, and structural break analysis—jointly support the conclusion that communication behaves increasingly like a necessity, with elasticity values well below unity across all quintiles. The narrowing gap between expenditure shares across income groups further confirms that digital services are no longer the preserve of the affluent, but rather a core aspect of socio-economic participation.

These findings have important implications for public policy. First, universal access to communication services should be framed as a digital right, not a market luxury. This calls for targeted interventions such as:

- Subsidized broadband programs for lower-income households to ensure equitable access;
- Digital literacy initiatives aimed at narrowing the second-level digital divide;
- Revisions to consumer price indices (CPI) and poverty measurement frameworks to more accurately reflect the rising weight of digital inclusion in household welfare.

Moreover, the study suggests that conventional theories of consumption—such as Engel's Law—require reinterpretation in the digital context. Digital services do not fit neatly into traditional categories of 'necessity' or 'luxury'; rather, they straddle multiple functional domains including communication, education, culture, and employment.

For future research, several avenues remain open. Cross-country comparative analyses using harmonized COICOP data would provide broader insights into whether Turkey's experience is unique or part of a wider trend among emerging economies. Additionally, addressing endogeneity and causal inference—for example, through instrumental variable techniques or natural experiments—would enhance the explanatory power of observed trends.

In sum, this study contributes to the evolving discourse on digital consumption and inequality by empirically documenting the democratization of communication expenditures. The findings challenge the notion that digital goods remain exclusive, and instead position them as structural necessities in the 21st-century household economy.

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