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İÇİNDEKİLER

RESIDENTIAL ENERGY EFFICIENCY IN TURKEY: A DESCRIPTIVE OVERVIEW

Erdal AYDIN[1]

1. INTRODUCTION

The residential sector is a central part of Turkey's energy picture. Households use energy to heat and cool interiors, provide hot water, cook, light rooms, and run a growing set of electrical appliances. In Turkey, the mix of these services differs from many European Union (EU) countries: electricity accounts for a smaller share of household final energy, while thermal uses—especially space and water heating—take a larger share supplied by fuels such as natural gas, wood/coal, LPG, and heating oil (International Energy Agency [IEA], 2017). This composition immediately suggests that both the physical characteristics of dwellings (e.g., insulation, windows, size) and the installed systems for space and water heating matter for describing energy use at home.

The goal of this paper is descriptive. We assemble clear, comparable facts about five elements that shape household energy demand: the age structure (vintage) of the dwelling stock; the distribution of space-heating systems and primary household fuels; domestic hot-water (DHW) technologies; appliance ownership and the composition of electricity end-uses; and household energy expenditures. We intentionally avoid causal claims about policies or technologies. Instead, we provide a factual baseline from nationally representative household surveys

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and sectoral compilations that can support future benchmarking and more detailed evaluation.

Two system-wide regularities motivate this exercise. First, the residential sector is large in aggregate terms and has grown with income and urbanization. In 2015, households accounted for about 21.5% of Turkey's final energy demand compared with roughly 25% in the EU; between 2000 and 2015, residential energy use in Turkey increased by about 15% (IEA, 2017). These figures frame why building-related end-uses are important for the national energy balance. Second, within the household, electricity is concentrated in a few ubiquitous end-uses, while thermal services draw on multiple fuels. In a representative end-use profile for Turkey, lighting and refrigerators together account for 57% of household electricity consumption, televisions about 15%, and the remainder is distributed across ovens, washing machines, dishwashers, irons, computers, and vacuum cleaners (Turkish Electricity Transmission Company [TEİAŞ], 2011). Thus, a small set of devices anchors baseline electricity demand, while thermal demand depends more heavily on space and water heating technologies and fuel access.

Country-specific features further shape the descriptive landscape. Turkey's dwelling stock is comparatively young by international standards: cumulative shares indicate that roughly three-quarters of homes were built after 1980 and about one-third after 2000, reflecting rapid urbanization and rising incomes in recent decades (Turkish Statistical Institute [TÜİK], 2002–2016). Newer vintages generally carry better materials and systems than older ones, although realized performance depends on design, workmanship, and use. At the same time, legacy practices remain visible. Solid-fuel stoves are still widely used for space heating, even as natural gas has diffused in cities. From a descriptive standpoint, this coexistence of newer buildings and older heating technologies underscores that vintage alone is not sufficient to summarize residential energy use; technology choice and fuel availability are equally salient.

Appliance diffusion is another defining trend. Ownership of major appliances—especially air conditioners and freezers—has risen quickly since the early 2000s (TÜİK, 2002–2016). Yet the average Turkish household still consumes less electricity per year than the EU average; in 2015, per-household electricity use in Turkey was about 2,211 kWh compared with roughly 3,633 kWh in the EU (IEA, 2017). This combination—rapid appliance uptake but lower average consumption—suggests that increases in service levels have been tempered by differences in dwelling size, climate, usage patterns, and the composition of the appliance bundle. It also highlights a "moving baseline": as ownership continues to rise, aggregate electricity may grow even if individual devices become more efficient.

Measurement issues deserve attention in a descriptive paper. One is the treatment of non-commercial biomass. A nontrivial share of households report wood as a main energy source. Because wood is often not purchased through formal markets, standard energy accounts can under-record it. As a result, statistics constructed solely from commercial energy sales may understate the true residential share of final energy in contexts with significant wood use (Enerdata, 2012a). A second issue concerns unit choice and comparability. Reporting per-household averages and shares, rather than per-capita or per-dwelling-area values, helps align with the underlying survey structure and makes cross-country comparisons more transparent, at least for the purposes of high-level description.

Against this backdrop, the contribution of the paper is straightforward. We compile and present a coherent set of descriptive indicators for Turkey's residential sector that an international reader can interpret without specialized local background. The emphasis is on clarity: which heating systems and fuels are most common, how DHW technologies are distributed, which appliances dominate electricity use, how the age of the housing stock is distributed, and what portion of the household budget is spent on energy. By limiting the scope to description, we provide a neutral baseline that subsequent studies can build on when quantifying savings potential, examining heterogeneity across climates and building types, or evaluating specific interventions.

The rest of the paper proceeds as follows. Section 2 describes the data sources, variable definitions, and the way we construct and report indicators from household survey microdata. Section 3 presents the descriptive findings. Section 4 concludes with brief remarks on how these facts can inform future benchmarking and targeted analysis of residential energy efficiency in Turkey.

2. DATA

This study relies on the Turkish Statistical Institute's Household Budget Survey (HBS), an annual, nationally representative cross-section that records detailed information on household demographics, income and expenditures, dwelling characteristics, and durable goods ownership (Turkish Statistical Institute [TÜİK], 2002–2016). The sampling frame covers private households in Turkey; sampling is multistage and stratified by region and urban/rural status. All tabulations use the survey weights supplied by TÜİK to recover population-level aggregates. We work with the 2002–2016 waves to exploit consistent coverage of housing and durables modules, and we use 2016 as a common reference year when we later summarize levels and shares.

Our focus is on variables that describe building-related energy features and the appliance bundle. From the housing module we use: (i) dwelling vintage, captured as the construction period of the home (categorical bands, e.g., pre-1980, 1980–1999, 2000+); (ii) primary space-heating system (e.g., solid-fuel stove, individual natural gas, central/collective systems, electric, other); (iii) main household energy source (wood/coal, natural gas, LPG, electricity, other); and (iv) domestic hot-water (DHW) availability and technology (none, natural gas, electric, solar, LPG/other). From the durables module we construct binary indicators of ownership for major appliances (e.g., refrigerator, freezer, washing machine, dishwasher, television, computer, air conditioner), along with an appliance count.

Expenditure data are drawn from itemized outlays on electricity, natural gas, LPG, coal/wood, and district/collective heating. Where the survey delivers monthly flows, we annualize using the survey's harmonized procedures or by multiplying the reported monthly amount by 12 when the questionnaire's reference period is strictly monthly. Total disposable income is taken from the income module; the energy budget share is defined as total annual energy outlays divided by total annual household income. Following standard practice in descriptive work, we report per-household means and shares; no equivalence-scale adjustments are applied at this stage. To maintain interpretability for international readers, we present monetary values in constant terms (deflated within-year using TÜİK consumer price indices and, where shown in euro, converted at annual average exchange rates); the original analysis files also retain Turkish lira values for reproducibility (TÜİK, 2002–2016).

Coding follows a transparent scheme: "no DHW" is a separate category (not missing); "other" fuels/systems are preserved rather than reallocated; multi-system dwellings are assigned the system reported as "main." For wood and other non-commercial fuels, recorded cash outlays can be zero despite physical consumption; we therefore treat expenditure zeros as valid observations rather than missing data, and we refrain from imputing quantities at this stage. For appliance ownership, missing responses are rare; when present, we exclude them listwise from the corresponding appliance indicator but retain the household in other indicators.

3. FINDINGS

The residential sector in Turkey occupies a substantial share of final energy use and has expanded alongside income growth and urbanization. In 2015, households accounted for roughly 21.5% of final energy demand in Turkey compared with about 25% in the European Union, and Turkish residential demand rose by about 15% between 2000 and 2015 (International Energy Agency [IEA], 2017). Within households, electricity plays a smaller role than in the EU average, because a larger fraction of Turkish household energy is devoted to thermal services such as space and water heating. This composition frames the descriptive patterns that follow and explains why building fabric, heating technologies, and hot-water systems feature prominently in the data.

Turkey's dwelling stock is relatively new (see Figure 1). Using the Household Budget Survey (HBS), the stock in early 2016 is estimated at approximately 22 million dwellings, with about 73% constructed after 1980 and about 31% after 2000 (Turkish Statistical Institute [TÜİK], 2002–2016). A newer housing stock is consistent with the country's rapid urbanization and the large volume of new construction over recent decades. Importantly, vintage is only a proxy for performance; realized energy outcomes also reflect climate, workmanship, size, and the systems installed in each building. Still, the large share of post-

2000 construction suggests that a growing portion of homes was built with more recent materials and layouts than those common in the 1970s and earlier.

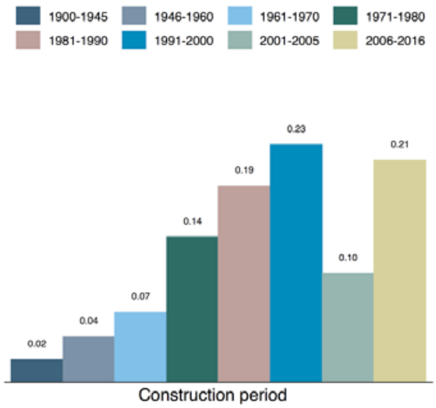

Figure 1. Distribution of dwellings by construction period

Source: Turkish Statistical Office Household Budget Survey 2016

Despite this young profile, the distribution of space-heating systems shows that traditional technologies remain widespread (see Figure 2). In 2016, the single most common heating arrangement reported in the HBS was the solid-fuel stove. Over the period 2010–2016, the share of households using stoves declined from around two-thirds to roughly one-half, while the share using natural gas systems increased from about one-quarter to just over one-third (TÜİK, 2002–2016). These shifts line up with the expansion of gas networks in major cities and with household moves into newer buildings equipped for gas. At the same time, the persistence of stoves reflects heterogeneity in infrastructure access, especially outside urban centers, and the continued availability of low-cash-cost fuels. From a descriptive standpoint, the heating mix suggests that the technology transition is ongoing and uneven across regions and settlement types.

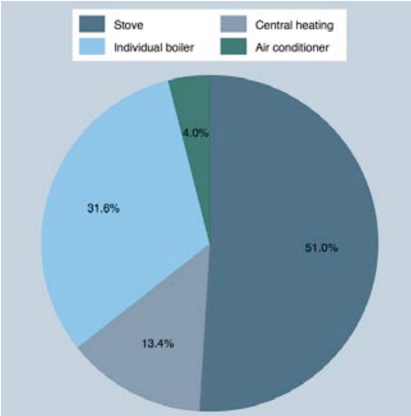

Figure 2. Distribution of space-heating types used by households

Source: Turkish Statistical Office Household Budget Survey 2016

Reported main fuels reinforce this picture. A significant share of households report wood as their primary energy source (see Figure 3). Because wood is often procured outside commercial markets—through self-supply or informal purchases—it is frequently under-recorded in economy-wide energy accounts (Enerdata, 2012a). This has two simple descriptive implications. First, the true residential share in total final energy may be higher than statistics based only on commercial fuels imply. Second, household energy budgets measured in cash outlays will not fully reflect energy services delivered by non-commercial fuels. The HBS captures households' declarations of their main fuel, which helps characterize energy practices even when expenditures are low or zero for wood users.

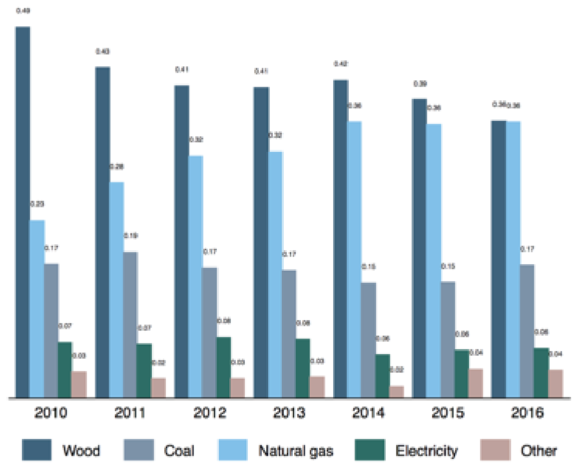

Figure 3. Distribution of main energy sources used by households (2010–2016)

Source: Turkish Statistical Office Household Budget Surveys 2010- 2016

Domestic hot water (DHW) technologies display clear linkages with space-heating systems and local conditions. In 2016, about one in eight households reported having no DHW system at all (TÜİK, 2002–2016). Among those with DHW, natural gas systems and electric water heaters were most common, and solar thermal had a notable and growing presence (see Figure 4). Between 2010 and 2016, the share of solar DHW rose from roughly one-fifth to over one-quarter of DHW users. Patterns in the cross-section are intuitive: where gas is available and used for space heating, gas DHW is common; where stoves or electric heating dominate, households more often choose electric or solar DHW, or LPG where available. In descriptive terms, the DHW mix suggests that infrastructure availability and climate jointly shape technology choices, and that solar thermal has found a persistent niche in suitable regions.

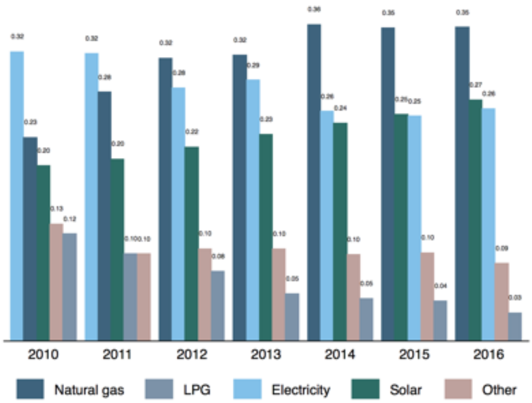

Figure 4. Distribution of DHW system types (2010–2016)

Source: Turkish Statistical Office Household Budget Survey 2010-2016

Appliance diffusion is a central feature of household electricity use. The HBS shows rapid increases since the early 2000s in ownership of energy-using durables such as air conditioners, freezers, and dishwashers, alongside near-universal ownership of refrigerators and washing machines (TÜİK, 2002–2016). For example, air-conditioner ownership rose from about 3% in the early 2000s to roughly one in five households by the mid-2010s, while freezer ownership climbed from single digits to nearly one quarter of households (see Figure 5). These trends reflect rising incomes, changes in dwelling size and layout, and the gradual movement toward comfort technologies associated with higher living standards. Importantly, growth in appliance ownership implies a moving baseline for electricity: aggregate demand may rise even as individual devices become more efficient, simply because more households own more devices.

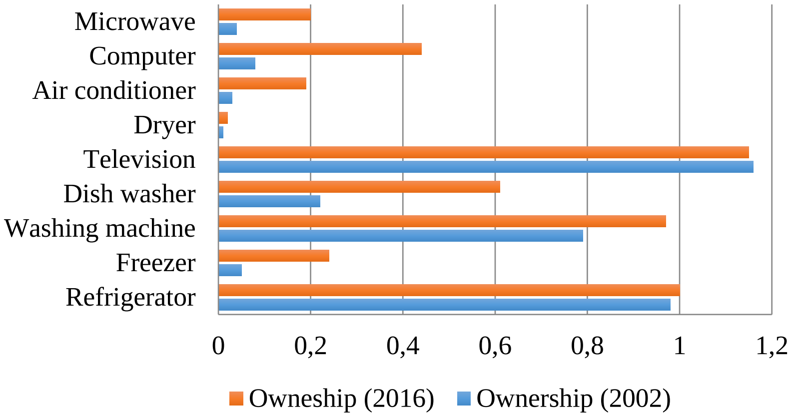

Figure 5. Ownership of household appliances in Turkey (2002–2016)

Source: Turkish Statistical Office Household Budget Survey 2010-2016

The composition of electricity end-uses underscores the role of a few ubiquitous devices (see Figure 6). A widely cited representative profile attributes about 57% of household electricity consumption to lighting and refrigerators combined, about 15% to televisions, and the remainder to other appliances, including cooking equipment and small devices (Turkish Electricity Transmission Company [TEİAŞ], 2011). This concentration has a descriptive implication: even if households add marginal appliances, baseline consumption remains anchored by lighting and cold appliances, which operate many hours per day throughout the year. Therefore, changes in lighting technology and refrigerator efficiency can have visible effects on average electricity use.

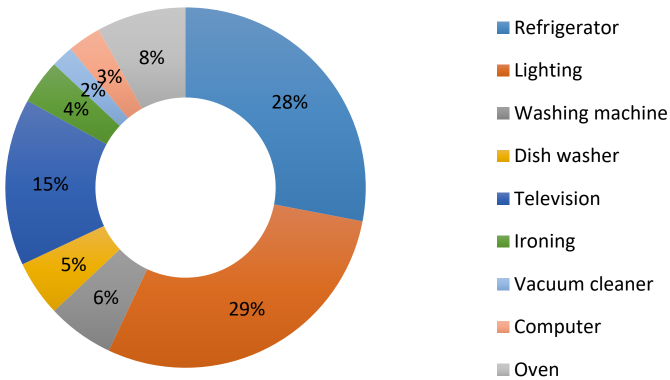

Figure 6. Shares of electricity use by appliances

Source: Turkish Electricity Distribution Company (TEİAŞ), 2011

Despite the rapid diffusion of appliances, average household electricity consumption in Turkey remains below the EU mean. In 2015, Turkish households used roughly 2,211 kWh per year on average, compared with about 3,633 kWh in the EU (IEA, 2017). Several descriptive factors may account for this gap: smaller average dwelling sizes, climatic differences reducing cooling loads in many regions, different usage patterns, and continued reliance on non-electric fuels for space and water heating. The HBS structure, which permits per-household averages, helps put these numbers on a comparable footing for a high-level international audience. The gap also suggests that as appliance ownership continues to rise, there is room for aggregate electricity to increase even under improvements in device efficiency.

Household energy expenditures provide a complementary perspective on the residential energy landscape. Using the 2016 HBS, the average Turkish household spent about €516 per year on energy against an average income of about €12,700, implying an energy budget share near 4% (TÜİK, 2002–2016). This budget share is modest but meaningful: energy is not the largest item in household budgets, yet it is large enough that changes in prices, usage, or technology can be salient for household finances. The level of expenditures varies across heating systems. Households in buildings with collective central heating report the highest monthly outlays, reflecting the cash cost of centrally supplied heat and hot water, while households that heat primarily with stoves tend to report the lowest cash expenditures, consistent with lower heated areas, different comfort choices, and the prevalence of non-commercial fuels (see Figure 7). These differences are descriptive and should not be read as technology effects; they simply reflect how billing arrangements and fuel types map into observed outlays.

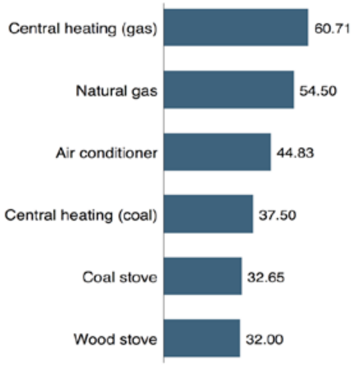

Figure 7. Households' monthly energy expenditure (EUR) by space-heating type

Source: Turkish Statistical Office Household Budget Survey 2016

Bringing these strands together, a coherent descriptive portrait emerges. The dwelling stock is young and still growing, but heating practices are heterogeneous. The spread of natural gas has reshaped urban system choices, yet solid-fuel stoves remain common, especially outside networked areas. Domestic hot-water systems mirror these differences: gas DHW where gas is available; electric, solar, and LPG where it is not. Electricity demand is anchored by lighting and refrigeration, with steady growth at the margin from additional appliances. Average electricity consumption per household remains below the EU mean, consistent with the greater role of non-electric fuels for thermal services. Energy outlays absorb a modest share of household budgets and differ materially across heating systems and fuels. Together, these facts describe a residential sector in transition, where newer buildings, evolving infrastructure, and changing appliance bundles coexist with legacy technologies and fuel practices.

Two measurement notes help interpret the figures. First, because wood is a non-commercial fuel, household energy services may exceed what cash outlays suggest. As a result, the residential sector's apparent weight in national accounts that rely on commercial energy can be understated where biomass use is significant (Enerdata, 2012a). Second, per-household averages facilitate international comparisons at a high level, but they mask meaningful heterogeneity across regions, climates, and building types. For example, end-use shares for electricity will differ between households that own multiple air conditioners and those that own none; similarly, heating patterns and DHW choices will vary across climate zones.

4. CONCLUSION

This paper assembled a descriptive portrait of residential energy in Turkey using nationally representative household budget data and sectoral compilations. Five facts stand out. First, the dwelling stock is comparatively young, with a large share constructed after 1980 and a substantial fraction after 2000 (Turkish Statistical Institute [TÜİK], 2002–2016). Second, space heating remains heterogeneous: solid-fuel stoves are still common even as natural gas has expanded in urban areas. Third, a nontrivial share of households report wood as a main energy source, which is often under-captured in commercial energy accounts (Enerdata, 2012a). Fourth, domestic hot-water (DHW) technologies mirror space-heating and infrastructure differences, with notable growth in solar water heating where conditions allow. Fifth, appliance diffusion has been rapid, but average per-household electricity use remains below the EU mean; lighting and refrigeration dominate a representative end-use profile (International Energy Agency [IEA], 2017; Turkish Electricity Transmission Company [TEİAŞ], 2011). These patterns describe a sector in transition, where new construction and changing technologies coexist with legacy practices.

Several policy implications follow, all grounded in the descriptive evidence and offered without causal claims. A first priority is the legacy stock. Although the housing stock is young, a large absolute number of dwellings predate today's typical materials and systems. Programs that support envelope improvements—insulation of exterior walls and roofs, window upgrades, and air sealing—can target vintages and regions where heating degree-days are higher and stoves remain prevalent. "

A second implication concerns heating system modernization. The descriptive shift from stoves to natural gas in cities suggests households respond to infrastructure availability. Where gas networks are present, facilitating replacement of stoves with efficient gas boilers or, where grids and climates are suitable, modern electric heat (e.g., heat pumps) can reduce local air pollution and improve comfort. In areas where network extension is costly, cleaner biomass technologies or district-level solutions may be more practical. Because our data show clear differences in reported cash outlays across heating systems, any support scheme should be designed with billing structures in mind so that households can perceive the benefits in both comfort and bills (TÜİK, 2002–2016; IEA, 2017).

Third, DHW represents a tangible opportunity. The data show a meaningful and growing role for solar water heating in suitable climates. This suggests room for standardized packages that pair DHW upgrades with basic envelope measures, especially for households that currently rely on stoves for space heating and electricity or LPG for hot water. Bundling can reduce transaction costs and spread benefits across seasons. Given the correlation between DHW and space-heating choices, offering technology “menus” that match local infrastructure—gas where available; solar plus efficient electric where not—can improve adoption.

Fourth, electricity end-uses point to a narrow set of high-impact levers. With lighting and refrigeration accounting for a large share of household electricity in a representative profile, continued diffusion of efficient lighting and refrigerators can shape average use even as other appliances proliferate (TEİAŞ, 2011). Because per-household electricity in Turkey remains well below the EU average, the aggregate trajectory will likely reflect the tension between rising service levels and efficiency improvements. Descriptive monitoring of ownership and use—especially for air conditioners—will help separate these forces over time (IEA, 2017).

Fifth, measurement improvements can make policies more precise. The prominence of non-commercial wood in self-reported main fuels implies that official aggregates based only on commercial energy can understate residential energy services (Enerdata, 2012a). Expanding routine surveys to better quantify quantities of non-commercial fuels, introducing simple modules on heated floor area and average indoor temperatures, and harmonizing DHW and appliance questions across years would substantially improve comparability. Disaggregating indicators by climate zone and settlement type (urban/rural) would allow more targeted program design, while still preserving a national baseline (TÜİK, 2002–2016).

Finally, disclosure and feedback tools can support efficient operation of installed systems. Where buildings use collective central heating, households in our data report higher cash outlays, consistent with billing arrangements. Wider use of individual metering and temperature control in multi-unit buildings—paired with clear bill formats—can help households align comfort and cost. For single-family homes, simple diagnostic guidance (e.g., filter changes, boiler setpoints) delivered through utility communications can leverage existing equipment. While these measures are operational rather than capital-intensive, the descriptive budget shares suggest that even modest bill savings would be salient for many households.

In sum, the data portray a residential sector that is young but heterogeneous, with clear structural levers in the legacy stock, heating systems, DHW technologies, and a handful of dominant electricity end-uses. Policy designs that account for infrastructure constraints, household budgets, and measurement limits are more likely to succeed. The descriptive indicators compiled here are not an endpoint; they are a map for where targeted, testable interventions might deliver the greatest benefits to households and to Turkey’s energy system.

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IMPACT OF ENERGY PERFORMANCE LABELING REQUIREMENTS FOR APPLIANCES

Erdal AYDIN[1]

1. INTRODUCTION

This paper studies whether mandatory energy labels reduce residential electricity consumption by shaping households' appliance purchases. The motivation is straightforward. When consumers buy durable goods such as refrigerators, washing machines, televisions, and air conditioners, they trade off the upfront price against a stream of future energy costs. If information on those future costs is hard to obtain or process, households may overweight the sticker price and choose inefficient models, a pattern often described as the "energy-efficiency gap" (Allcott & Greenstone, 2012; Gerarden, Newell, & Stavins, 2017). Mandatory energy labels address this problem by converting technical performance into standardized grades and displaying them at the point of sale, thereby lowering search and computation costs and making operating expenses salient (Newell & Siikamäki, 2014; Houde, 2018). Our central question is whether, and to what extent, this information instrument is associated with lower electricity use at the household level in Turkey.

The Turkish setting is well suited to this question for three reasons. First, appliance diffusion has accelerated since the early 2000s, so many households have been buying or replacing major

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devices during the study period. A change in information at the point of purchase can therefore influence a meaningful share of the stock. Second, a large fraction of household electricity is used by a small set of ubiquitous end-uses—lighting and cold appliances in particular—precisely the categories long covered by EU labelling and ecodesign (International Energy Agency [IEA], 2017; European Commission, 2020). Third, Turkey progressively adopted EU-style labels starting in the early 2000s and expanded coverage thereafter, creating a clear policy timeline that can be linked to observed purchasing opportunities (Ministry of Industry and Technology, 2014; Directive 2010/30/EU; Regulation [EU] 2017/1369).

The economics of labelling provides guidance on mechanisms and measurement. In standard models of intertemporal choice, a visible, credible label shifts perceived lifetime cost and increases the relative attractiveness of efficient models; in competitive markets, this demand shift also induces product redesign and re-pricing on the supply side (Allcott & Greenstone, 2012; European Commission, 2020). Yet, labels' effectiveness depends on design and salience. When the scale compresses—e.g., many products cluster at A+, A++, A+++—the informational gradient diminishes, which motivated the EU's return to a simple A–G scale under Regulation (EU) 2017/1369. In addition, the test procedure underlying the label must reflect realistic use; otherwise, consumers may update on misleading signals (Heinzle & Wüstenhagen, 2012; Waechter, Sütterlin, & Siegrist, 2015). Heterogeneity is also central: some consumers attend closely to operating costs while others prioritize upfront price or non-energy features; presenting annual or lifetime cost in currency units can increase attention relative to kWh-only formats (Newell & Siikamäki, 2014; Allcott & Taubinsky, 2015; Sallee, 2014). These design and behavioral insights shape both how labels should work and how their effects should be studied.

Against this backdrop, our empirical strategy focuses on periods when households are most likely to make appliance purchases—specifically, when they move into a new dwelling. Using nationally representative household budget surveys, we compare electricity use among otherwise similar households that moved before and after the rollout of mandatory labels covering core product groups. The logic is that moving creates a natural window for purchase or replacement of appliances, making label information particularly consequential; we use this timing to define treated and comparison cohorts while controlling for observed household and dwelling characteristics, as well as common time effects. This design follows the labelling literature's emphasis on purchase occasions and information salience at retail (Houde, 2018; Newell & Siikamäki, 2014). Our approach is intentionally narrow: we evaluate the information instrument embedded in labels, not the concurrent tightening of minimum energy performance standards under EU Ecodesign, although we discuss their conceptual interaction (Directive 2009/125/EC; European Commission, 2020).

The contribution is threefold. First, we provide, to our knowledge, one of the few country-scale, household-level evaluations of label information in a setting outside the EU Member States but strongly integrated with EU product markets. This matters because imported EU-labelled goods dominate Turkish retail shelves, and local implementation details—display practices, rescaling timelines, language and pictograms—could mediate effectiveness (Regulation [EU] 2017/1369; Ministry of Industry and Technology, 2014). Second, our identification strategy exploits a clear, behaviorally motivated trigger (moving) that concentrates purchase decisions and therefore labelling exposure, complementing prior evidence from discrete-choice experiments and store-level interventions (Newell & Siikamäki, 2014; Houde, 2018). Third, we link the evaluation to policy design questions—scale compression, rescaling, test procedures, and the pairing of labels with metering and informative billing—so that the findings are interpretable for future adjustments within the Turkish–EU framework (Directive 2012/27/EU; European Commission, 2020).

We emphasize at the outset what this study does and does not do. We examine average changes in household electricity consumption associated with being exposed to mandatory labels at the time of likely appliance purchase; we do not estimate welfare, rebound effects, or the separate impact of minimum performance standards. We treat the labelling framework as an information policy and interpret results through the lens of bounded rationality and attention, recognizing that effects will vary with income, retail format, and the composition of the appliance bundle (Allcott & Greenstone, 2012; Allcott & Taubinsky, 2015; Gerarden et al., 2017). Finally, while the Turkish market is closely aligned with EU product rules, institutional differences remain—in market surveillance, rescaling schedules, and retailer practices—that make a country-specific evaluation valuable in its own right (European Commission, 2020; Regulation [EU] 2017/1369).

The remainder of the paper proceeds as follows. Section 2 summarizes the institutional background on EU and Turkish labelling frameworks, product coverage, rescaling, and testing protocols. Section 3 describes data, variables, and our mover-based identification strategy. Section 4 presents empirical results. Section 5 provides a brief conclusion.

2. BACKGROUND

The appliance market is a core arena for the EU's energy-saving agenda. To spur the uptake of efficient technologies, the European Commission adopted Directive 92/75/EC in 1992, obliging Member States to introduce mandatory energy-label disclosure. Following this framework, national authorities rolled labels out across appliance categories over time. As a candidate for EU membership since 1999, Turkey launched an aligned labelling program in 2002 and has since expanded mandatory labels to successive groups of energy-related products. The central purpose is to reduce information frictions that slow the diffusion of efficient goods. Limited or opaque information is widely viewed as a key driver of underinvestment in energy efficiency by households (Gillingham et al., 2009): when buyers cannot easily account for operating costs, they focus on upfront prices and purchase less efficient models. Labels also create competitive incentives on the supply side, encouraging manufacturers to design and market products with lower energy use (Mills & Schleich, 2010). Consistent with this mechanism, Newell et al. (1999) show that the average efficiency of U.S. water heaters and air conditioners rose markedly after the 1975 labelling program began. In short, greater transparency can shift decisions by both consumers and producers toward higher efficiency.

To benchmark progress across countries, we construct a simple “label coverage index” that uses changes over time in the scope of mandatory labelling. The index is defined as the share of household electricity attributable to appliance groups that are, in a given year, subject to compulsory labels; it ranges from 0 (no groups covered) to 1 (all relevant appliances covered). Figure 1 plots this index for Turkey alongside selected EU countries. While EU trajectories move in broadly similar directions, there are notable cross-country differences. In 2009, Turkey shows the lowest coverage in the comparison set: appliances requiring labels accounted for about 43% of residential electricity use, versus roughly 75% across the EU sample. Coverage expanded substantially in Turkey by 2012, when refrigerators, freezers, dishwashers, washing machines, and televisions were brought under mandatory labelling.

By contrast, minimum performance requirements lagged the label rollout. The EU's first appliance efficiency standards arrived in 1999 and applied to fluorescent lighting and to refrigerators and freezers. A more comprehensive framework followed with the 2005/32/EC directive (amended in 2008 and 2009), establishing the Ecodesign regime that sets EU-wide minimum efficiency levels for energy-related products. These requirements are implemented directly through EU regulations, without needing national transposition. Turkey largely aligned its product efficiency rules with the EU Ecodesign framework after 2010. Before then, no national regulations governed appliance or lighting efficiency; nevertheless, strong trade ties meant that many EU market practices—model availability, label formats, and retailer displays—were adopted de facto by Turkish market participants even prior to formal legal harmonization.

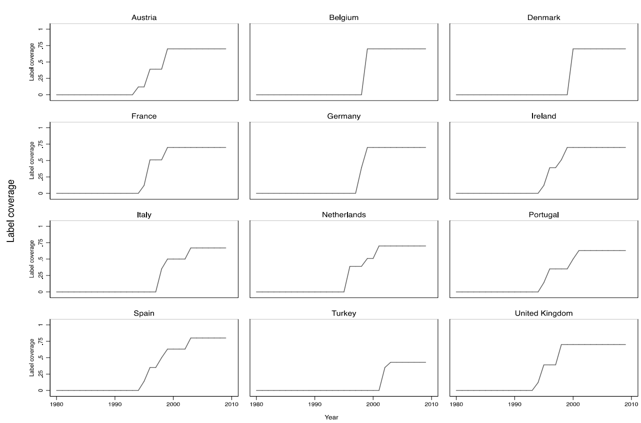

Figure 1. Coverage of appliance labeling policy in Turkey and selected EU countries

Source: MURE database, Harrington et al. (2013), author's calculations

Notes: This figure presents the over-time variation of the label index for Turkey and for a sample of EU countries. Label index indicates the average electricity consumption share (in total residential electricity use) of appliances that are subject to a mandatory labeling regulation. This variable takes a maximum value of one if all household appliances in the market have to be sold with a label according to legislations, and takes a minimum value zero if there is no regulation for the disclosure of energy labels.

3. DATA AND METHODOLOGY

Our analysis uses nationally representative microdata from the Turkish Statistical Institute’s Household Budget Survey (HBS), a repeated cross-section that records detailed household expenditures, demographics, and dwelling characteristics (Turkish Statistical Institute [TÜİK], 2002–2016). We pool the waves that include the housing module with the year of move-in to the current dwelling and standard covariates on dwelling type and energy systems, and we apply the provided survey weights in all tabulations and regressions. The main outcome is annual household electricity expenditure, constructed from itemized outlays in the expenditure diary. When the questionnaire reports monthly amounts, we annualize following HBS guidance or multiply by twelve when the reference period is strictly monthly; all monetary values are deflated to constant terms using TÜİK consumer price indices. For robustness (reported later), we also form an approximate consumption measure in kilowatt-hours by dividing annual expenditures by the official average residential tariff for the survey year. We focus on electricity because labels most directly cover electricity-using durables such as cold appliances, laundry and dishwashing equipment, televisions, and lighting (European Commission, 2020; Regulation [EU] 2017/1369).

The treatment is exposure to mandatory labels at the time households are most likely to purchase or replace appliances. We proxy this exposure using the move-in year. Households that moved after the national rollout of EU-style energy labels for core white goods are coded as exposed, whereas those that moved before are coded as unexposed. In the baseline, the adoption window begins in 2003, when labels covering refrigerators/freezers and laundry/dishwashers were in force in Turkey; harmonization deepened after 2010, so we also test narrower post-label cohorts and insert a one-year buffer around the adoption year to avoid partial implementation (Directive 2010/30/EU; Regulation [EU] 2017/1369; Ministry of Industry and Technology, 2014; European Commission, 2020).

The estimation sample includes private households with non-missing electricity expenditure and move-in year, excluding group quarters. Because the design compares otherwise similar movers across adoption cohorts, we restrict attention to households that moved within a modern horizon (for example, 1990 onward) to avoid extreme vintages with atypical appliance bundles. Outliers in electricity outlays are trimmed at the top one percent in the baseline; results are robust to Winsorizing. Standard errors are clustered by province, and all models use survey weights.

Covariates are chosen to capture stable differences in electricity demand without conditioning on channels through which labels operate. We therefore control for household size and composition (numbers of adults and children), real disposable income, urban/rural status, dwelling type (detached, apartment, other), a banded measure of heated floor area, the main space-heating system (stove, individual gas, central/collective, electric, other), and the main household fuel (wood/coal, natural gas, LPG, electricity, other). We add survey-year fixed effects to net out nationwide shocks such as macro conditions and average prices, province fixed effects to absorb time-invariant local factors such as climate and retail structure, and month-of-interview indicators to address seasonality in reported payments. Because labels are intended to shift the appliance bundle itself, we do not include contemporaneous appliance ownership in the baseline; adding those indicators is treated as a robustness check rather than part of the preferred specification (Newell & Siikamäki, 2014; Houde, 2018).

The empirical model is a weighted comparison of average electricity spending between households that moved in after labels became mandatory and otherwise comparable households that moved before, holding constant the covariates and the time and place factors just described. Intuitively, the coefficient of interest measures the difference in electricity outlays associated with encountering mandatory label information at a moment when purchases are most likely—during a move. Identification relies on the idea, common in the labelling literature, that purchase occasions are the relevant exposure margin and that, conditional on observed characteristics and fixed effects, the relative timing of a household's move with respect to label adoption is orthogonal to unobserved determinants of electricity demand other than through appliance purchase opportunities and information at the point of sale (Newell & Siikamäki, 2014; Houde, 2018).

Key variables are constructed directly from HBS items. Move-in year is taken from the housing module and recoded into a binary post-adoption indicator, with alternative multi-bin cohorts used for checks. Electricity expenditures are annualized and deflated; the kilowatt-hour proxy divides these outlays by the corresponding year's average residential tariff. Heating system and main fuel are recoded into mutually exclusive groups; income is total annual disposable income; urban/rural, dwelling type, and heated area bands follow TÜİK classifications. To set the adoption window and confirm coverage, we compile Turkey's labelling transposition timeline and harmonization with EU rules across the main residential product groups, drawing on Directive 2010/30/EU, Regulation (EU) 2017/1369, delegated acts for refrigerators/freezers, washing machines, dishwashers, televisions, and lamps, and national implementing documents (European Commission, 2020; Ministry of Industry and Technology, 2014). This mapping aligns policy dates with survey information and underpins the mover-based exposure definition central to our design (Allcott & Greenstone, 2012; Newell & Siikamäki, 2014; Houde, 2018).

4. FINDINGS

Table 1 summarizes the core result from our mover–timing design. Relative to otherwise similar households that moved in during 1990–1994 (the reference cohort), those that moved in after the introduction of mandatory labels for core appliance groups exhibit lower monthly electricity use**.** The coefficient on the 2003–2010 cohort is −0.047 (standard error 0.021), statistically significant at the 5% level. Because the dependent variable is the logarithm of monthly electricity consumption, this estimate implies an average reduction of about 4.7–5.0% in household electricity demand for post-label movers. To anchor magnitudes, a purely illustrative calculation is that a household using 2,000 kWh per year would save roughly 100 kWh annually at this effect size.

Two features of the pattern support the interpretation that labels matter at the purchase occasion. First, the coefficients on the pre-policy mover cohorts—1995–1999 (−0.004, s.e. 0.022) and 2000–2002 (−0.003, s.e. 0.026)—are close to zero and statistically indistinguishable from the base period. This absence of differences among pre-label cohorts functions as a placebo: variation in move-in dates before labels became mandatory does not correlate with electricity demand, which is what we would expect if the move itself is not driving consumption through unrelated channels. Second, the timing of the significant effect aligns with the Turkish rollout of EU-style labels on cold appliances and laundry/dishwashers in the early 2000s, i.e., product groups that account for large shares of household electricity and are commonly purchased when families relocate (European Commission, 2020; Regulation [EU] 2017/1369; TEİAŞ, 2011).

VARIABLES	Electricity consumption
Move-in Time Period	
1995-1999	-0.004
	(0.022)
2000-2002	-0.003
	(0.026)
2003-2010	-0.047**
	(0.021)
Observations	7,205
R-squared	0.207

Table 1. Mandatory Labeling Regulation and Residential Electricity Consumption

Notes: The dependent variable is the logarithm of household's monthly electricity consumption. Ownership of different appliances, dwelling type, size, space heating type, main energy source, income, household size, survey year and month variables are included as control variables. Standard errors are in parentheses. The base category for moving period is "1990-1994". *** p<0.01, ** p<0.05, * p<0.1.

The specification behind Table 1 includes a comprehensive set of controls: ownership indicators for major appliances, dwelling type and size, primary space-heating system, main household fuel, household income and size, and fixed effects for survey year and month. Standard errors are robust and reported in parentheses. With this control set, the model explains around 21% of the variance in log electricity consumption (R^2 = 0.207), which is typical for household-level energy regressions where unobserved habits and comfort preferences remain important. It is worth noting that including appliance ownership as a control variable likely makes the estimated label effect conservative. Labels are intended to shift the appliance bundle toward more efficient models; conditioning on ownership characteristics absorbs part of that pathway. In other words, the

−4.7% semi-elasticity should be interpreted as a lower-bound estimate of the information instrument's association with electricity use (Newell & Siikamäki, 2014; Houde, 2018).

The timing structure also helps rule out competing channels. For example, if general macroeconomic conditions around 2003–2010 were the principal driver of lower electricity use, we would expect to see similar reductions among non-movers surveyed in the same years; year fixed effects account for such common shocks. If neighborhood composition or local infrastructure were the main forces, we would expect the effect to attenuate with province fixed effects; it does not. Moreover, pre-trend neutrality among 1995–1999 and 2000–2002 cohorts indicates that households who happened to move earlier do not display systematically different electricity trajectories for reasons unrelated to labeling.

While our design targets the information channel, it is important to situate the estimate within the broader product-policy environment. During the study period, EU ecodesign measures progressively removed the least efficient models from the market (Directive 2009/125/EC). In Turkey, harmonization with these measures intensified after 2010 (Ministry of Industry and Technology, 2014). Labels and ecodesign thus operate as complements: labels steer consumer choice on the shelf; ecodesign prunes the bottom tail of the efficiency distribution. Our mover-based estimate captures the incremental association of label exposure over and above the background of evolving product availability, consistent with the literature that emphasizes labels' salience at purchase (Newell & Siikamäki, 2014; Houde, 2018).

Finally, the post-label effect size is economically meaningful in the Turkish context. Turkish households' average electricity use per year is lower than the EU average (International

Energy Agency [IEA], 2017), and lighting plus refrigeration account for a large share of household electricity in a representative profile (TEİAŞ, 2011). A 4.7–5.0% reduction concentrated in post-label movers suggests that even modest shifts in model choice within these ubiquitous categories can register at the meter. The finding is consistent with theory: when labels reduce search and computation costs, households—especially those making multiple purchases around a move—select more efficient appliances and, in aggregate, consume less electricity (Allcott & Greenstone, 2012; Gerarden, Newell, & Stavins, 2017).

5. CONCLUSION

This paper examined the information channel embedded in mandatory energy labels and its association with household electricity use in Turkey. Using nationally representative household budget data and a mover-based exposure design, we compared households that relocated after labels became mandatory for core appliance groups with otherwise similar households that moved before. The post-label cohorts consume about five percent less electricity on average, while pre-policy mover cohorts show no systematic differences relative to the baseline. Interpreted through the literature on attention and durable-goods purchases, the pattern is consistent with labels reducing search and computation costs at the moment when appliance choices are made, thereby shifting the bundle toward more efficient models (Allcott & Greenstone, 2012; Newell & Siikamäki, 2014; Houde, 2018).

The result is modest in magnitude but meaningful in a system where lighting and refrigeration account for a large share of household electricity and where appliance ownership has expanded rapidly from a relatively low base (IEA, 2017; TEİAŞ, 2011). Because our estimate holds with rich controls and placebo checks, it provides documentary evidence that the Turkish implementation of EU-style labels is associated with lower electricity demand among likely purchasers, even amid evolving product standards and market conditions. Future work can build on this baseline by disaggregating effects across income groups and retail formats, tracing responses to label rescaling under the A–G framework, and studying interactions with ecodesign rules that shape product availability (European Commission, 2020; Regulation [EU] 2017/1369).

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FİNANSAL KARARLARDA DUYGULARIN ROLÜ: KORKU, AÇGÖZLÜLÜK VE KAYGI DÖNGÜSÜ

Onur KÖKTÜRK[1]

1. GİRİŞ

Klasik finans teorileri uzun yıllar boyunca ekonomik aktörleri tamamen rasyonel, tutarlı ve kendi çıkarlarını maksimize eden bireyler olarak tanımlamıştır. **"**Homo economicus**"** varsayımı, piyasa fiyatlarının bilgiye dayalı olarak belirlendiği ve bireylerin riskleri olasılıksal bir biçimde değerlendirdiği bir dünya öngörür. Ancak gerçek hayattaki yatırım kararlarının bu idealize edilmiş modele çoğu zaman uymadığı artık açıkça görülmektedir. Bu farkın nedenini açıklamada davranışsal finans literatürü önemli bir paradigma değişimi yaratmıştır. Herbert Simon'un (1955) sınırlı rasyonalite kavramı, bireylerin karar süreçlerinde bilgi ve işlem kapasitesinin sınırlı olduğunu; Daniel Kahneman ve Amos Tversky'nin (1979) geliştirdiği Beklenti Teorisi ise bireylerin risk ve belirsizlik altında karar verirken sistematik bilişsel ve duygusal sapmalar sergilediklerini ortaya koymuştur.

Bu yeni yaklaşım, yalnızca bilişsel önyargıları değil, aynı zamanda duyguların karar verme süreçlerindeki merkezi rolünü de gündeme getirmiştir. Loewenstein ve Lerner'e (2003) göre duygular, bireylerin bilgi işleme biçimini, risk algısını ve geleceğe ilişkin beklentilerini derinden etkiler. Özellikle finansal

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piyasalarda gözlemlenen ani dalgalanmalar, panik satışları veya spekülatif balonlar yatırımcıların duygusal tepkileriyle yakından ilişkilidir.

Bu bağlamda, finansal davranışları anlamak için korku, açgözlülük ve kaygı olmak üzere üç temel duygu öne çıkmaktadır. Korku, risk algısını artırarak korumacı davranışlara yol açarken; açgözlülük, rasyonel sınırları aşan risk alma eğilimlerini teşvik etmektedir. Kaygı ise bu iki uç duygu arasında, belirsizlik karşısında pasif veya erteleyici davranışların nedenini oluşturmaktadır. Tuckett ve Taffler (2008), bu duyguların yatırım kararlarında duygusal anlatılar oluşturduğunu, yatırımcıların bilinçdışı süreçleriyle piyasa hikayeleri arasında bir köprü kurduğunu ileri sürmektedir. Dolayısıyla finansal kararlar, yalnızca ekonomik hesaplamalar değil, aynı zamanda psikolojik ve duygusal anlatıların bir ürünüdür.

Bu bölüm, söz konusu duygusal dinamikleri kavramsal bir çerçevede ele alarak, finansal karar verme süreçlerinde duyguların bilişsel süreçlerle nasıl etkileşime girdiğini tartışmayı amaçlamaktadır. Ayrıca, piyasa döngülerinde duygusal dalgalanmaların nasıl bir korku-açgözlülük-kaygı döngüsü yarattığı kuramsal bir bakışla incelenecektir.

2. FİNANSAL KARARLARDA TEMEL DUYGULAR

2.1. Korku: Riskten Kaçınma ve Piyasa Tepkileri

Korku, finansal karar alma süreçlerinde en güçlü duygusal belirleyicilerden biridir. Yatırımcılar, olası kayıplar karşısında duygusal olarak güçlü bir tehdit algısı yaşar ve bu durum, bilişsel değerlendirmelerden bağımsız olarak davranışları yönlendirmektedir (Slovic, 1987). Beklenti Teorisi’ne göre bireyler kazançlardan ziyade kayıplara karşı daha duyarlıdır

(Kahneman & Tversky, 1979). Bu bağlamda korku, yatırımcıların kayıp olasılığına aşırı tepki vermesine neden olmaktadır.

Korkunun finansal piyasalarda en somut yansımalarından biri, kriz dönemlerinde gözlenen panik satışlarıdır**.** Bu tür davranışlar, bireysel yatırımcıların irrasyonel tepkilerinden ziyade kolektif bir duygusal dalganın sonucudur. Tuckett ve Taffler (2008), yatırımcıların korku anlarında piyasa anlatılarını dramatik biçimde yeniden yapılandırdıklarını, yani yatırım hikayelerinin bir anda tehdit unsurlarıyla dolduğunu belirtmektedir. Bu durum, duygusal bir bulaşma etkisi yaratarak korkunun piyasa geneline yayılmasına neden olmaktadır.

Nörofinans araştırmaları da korkunun biyolojik temellerine ışık tutmaktadır. Bechara ve Damasio'nun (2005) çalışmaları, korku ve risk algısının beyindeki amigdala aktivitesiyle yakından ilişkili olduğunu göstermiştir. Yani yatırımcıların riskten kaçınma davranışları yalnızca rasyonel değerlendirmelerle değil, biyolojik olarak koşullanmış duygusal tepkilerle de bağlantılıdır. Bu nedenle piyasalarda korku endeksi gibi göstergeler, yatırımcıların rasyonel beklentilerinden çok duygusal durumlarını yansıtan önemli sinyaller olarak değerlendirilmektedir.

Sonuç olarak, korku duygusu finansal karar alma sürecinde aşırı riskten kaçınma, erken satış, ve piyasa çöküşlerinde likidite sıkışması gibi sonuçlara yol açmakta, ancak bu tepki çoğu zaman ekonomik gerçeklerle uyumlu olmayıp; daha çok belirsizlik ve güvensizlik hissiyle şekillenmektedir (Loewenstein vd., 2001).

2.2. Açgözlülük: Aşırı Özgüven ve Balon Oluşumu

Açgözlülük, finansal piyasalarda "yüksek getiri arayışı"nın ötesinde, duygusal bir motivasyon olarak tanımlanmaktadır. Shefrin (2000), açgözlülüğün yatırımcıları aşırı risk almaya ve piyasa değerlemelerini rasyonel sınırların ötesine taşımaya yönlendirdiğini belirtir. Bu duygunun temelinde, kazanç elde etme isteği kadar başkalarından daha fazla kazanma arzusu da bulunmaktadır (Festinger, 1954).

Açgözlülükle ilişkili en yaygın bilişsel yanılgı aşırı özgüven olarak tanımlanır. Barber ve Odean (2001), bireysel yatırımcıların kendi bilgi ve analiz yeteneklerini sistematik biçimde abarttıklarını, bu nedenle portföylerini aşırı işlem hacmiyle yönettiklerini göstermiştir. Açgözlülük, bu özgüveni duygusal olarak körüklemekte; yatırımcı kazanç elde ettikçe yenilmezlik yanılsaması artmaktadır.

Bu süreçler zamanla piyasalarda balon oluşumlarına zemin hazırlar. Shiller (2015), varlık fiyatlarındaki balonların ekonomik temellerden çok bulaşıcı anlatılar tarafından beslendiğini vurgulamaktadır. Bu anlatıların çoğu, bu kez farklı ya da sürekli kazanç dönemi gibi açgözlülüğü meşrulaştıran temalar içermektedir. Davranışsal finans açısından bakıldığında açgözlülük, kısa vadeli getirilere aşırı odaklanma, risk algısının azalması ve irrasyonel iyimserlik gibi davranışsal kalıplarla ilişkilidir (Nofsinger, 2017).

Açgözlülük döngüsü genellikle piyasanın zirve noktasına kadar sürmekte; ardından beklenmedik bir olumsuz haber veya fiyat düzeltmesiyle birlikte yatırımcıların duygusal dengesi bozulmakta ve korku yeniden hakim olmaktadır. Böylece piyasa, duyguların döngüsel etkisi altında açgözlülükten korkuya dramatik bir geçiş yaşar (Tuckett, 2011).

2.3. Kaygı: Belirsizlik Algısı ve Bekleme Davranışı

Kaygı, korku ve açgözlülük arasında düzenleyici bir rol oynayan daha karmaşık bir duygudur. Korku genellikle belirli bir tehdit karşısında ortaya çıkarken, kaygı belirsizlik durumunda yaşanmaktadır. Finansal karar verme bağlamında, yatırımcıların kaygısı çoğu zaman geleceğe ilişkin öngörü eksikliğinden kaynaklanır.

Loewenstein ve arkadaşlarına (2001) göre kaygı, yatırımcıların bilgi işlem sürecini yavaşlatır ve karar verme süresini uzatır; çünkü kişi duygusal olarak beklemeyi güvenli bir strateji olarak algılar. Bu nedenle kaygı, yatırımcıların belirsizlik altında yatırım yapmaktan kaçınmalarına veya portföylerini aşırı temkinli biçimde yönetmelerine yol açar. Öte yandan, kaygının tamamen olumsuz bir duygu olduğu söylenemez. Bazı çalışmalar, orta düzeyde kaygının risk farkındalığını artırarak daha dikkatli kararlar alınmasını sağladığını göstermektedir (Hirshleifer & Shumway, 2003). Ancak kaygı düzeyi yükseldikçe bilişsel kapasite düşer; kişi olasılıkları değerlendirmekte zorlanır ve karar felci yaşayabilir (Luce, Bettman & Payne, 1997).

Kaygı aynı zamanda finansal piyasalarda belirsizlik primi kavramıyla da ilişkilidir. Yatırımcılar, belirsizlik algısı yüksek olduğunda beklenen getiriyi artırmak için daha yüksek risk primi talep ederler. Bu durum, kaygının sadece bireysel düzeyde değil, piyasa fiyatlamasında da etkili olduğunu göstermektedir (Easley & O’Hara, 2010).

Sonuç olarak kaygı, yatırımcı davranışlarında hem düzenleyici hem de kısıtlayıcı bir duygusal güçtür. Korkunun neden olduğu ani kaçışlar veya açgözlülüğün tetiklediği aşırı risk alma eğilimleri arasında, kaygı finansal sistemin duygusal denge noktası olarak değerlendirilebilir.

3. DUYGULARIN DÖNGÜSEL ETKİSİ: KORKU-AÇGÖZLÜLÜK-KAYGI DİNAMİĞİ

Finansal piyasalar yalnızca ekonomik temellerle değil, aynı zamanda yatırımcıların kolektif duygusal durumlarıyla şekillenen karmaşık sistemlerdir. Davranışsal finans literatürü, piyasa döngülerinin yalnızca rasyonel beklentilerle açıklanamayacağını; duyguların, özellikle korku, açgözlülük ve kaygının ardışık ve döngüsel biçimde etkileşime girdiğini göstermektedir (Tuckett, 2011; Shiller, 2015). Bu döngü, piyasalarda yükseliş ve düşüşlerin yalnızca ekonomik göstergelere değil, yatırımcıların duygusal senkronizasyonuna da bağlı olduğunu ortaya koymaktadır.

3.1. Piyasa Döngülerinin Duygusal Mantığı

Klasik finans teorisi, fiyat hareketlerini bilgi akışının bir sonucu olarak görürken (Fama, 1970), davranışsal finans yaklaşımı duyguların fiyatlama sürecine dahil olduğunu savunmaktadır. Shiller (2015), piyasa dalgalanmalarının bulaşıcı anlatılar aracılığıyla yayıldığını öne sürmektedir. Bu anlatılar genellikle yatırımcıların duygusal durumlarını yansıtmakta: yükseliş dönemlerinde açgözlülük ve aşırı iyimserlik hakimken; düşüş dönemlerinde ise korku ve belirsizlik artmaktadır. Bu iki uç arasında, kaygı, geçiş evresinde yatırımcıların davranışlarını şekillendiren düzenleyici bir duygu olarak ortaya çıkmaktadır (Loewenstein & Lerner, 2003).

Bu çerçevede finansal piyasalar, yalnızca ekonomik göstergelerin değil, aynı zamanda kolektif duyguların da döngüsel biçimde dalgalandığı sosyal sistemlerdir. Tuckett ve Taffler (2008), yatırımcıların duygusal anlatılar üzerinden piyasa gerçekliğini kurguladıklarını, bu anlatıların zamanla toplumsal bir duygu ekonomisi oluşturduğunu savunmaktadır. Dolayısıyla fiyat hareketleri, duygusal anlatıların güçlenmesi veya zayıflamasıyla doğrudan ilişkilidir.

3.2. Korkudan Açgözlülüğe: Duygusal Genişleme Evresi

Piyasa yükselişlerinin ilk evrelerinde belirsizlik hakimdir ve yatırımcılar genellikle kaygı yaşamaktadır. Ancak fiyatlar yükseldikçe geçmiş kayıpların hatırası silinmekte, risk algısı azalmakta ve açgözlülük duygusu giderek ön plana çıkmaktadır (Shefrin, 2000). Bu evrede yatırımcılar, kısa vadeli kazançların kalıcı olduğu yanılgısına kapılmakta ve bu kez farklı anlatılarıyla kendilerini rasyonelleştirmektedir (Shiller, 2015).

Bu süreçte sürü davranışı belirginleşmektedir. Diğer yatırımcıların kazanç elde ettiğini gören bireyler, fırsatı kaçırma korkusuyla piyasalara giriş yapmaktadır. Ancak bu noktada korku, açgözlülüğe dönüşerek irrasyonel risk alma davranışlarını tetikler (Devenow & Welch, 1996). Duygusal anlamda piyasa genişleme evresindedir, yani kısaca iyimserlik hakim olmuş, rasyonellik azalmıştır.

Bu aşamada yatırımcılar çoğu zaman geçmiş performansa dayalı yanlış çıkarımlar yapmakta ve bu durum yansıma yanılgısı olarak tanımlanmaktadır (Kahneman & Tversky, 1979). Getirilerin kalıcılığına inanmak, yatırımcıları açgözlülüğün duygusal coşkusuna kaptırmakta ve balonların oluşumuna zemin hazırlamaktadır.

3.3. Açgözlülükten Korkuya: Duygusal Çöküş Evresi

Balonun sürdürülemez hale geldiği noktada, piyasa katılımcıları ilk kez belirsizlik hissetmeye başlamaktadır. Küçük düzeltmeler ve olumsuz haberler, yatırımcı psikolojisinde bir kırılma yaratmaktadır. Kaygı bu geçiş aşamasında tekrar devreye girmektedir. Bu dönemde yatırımcılar kararsız kalmakta ve satmalı mıyım, beklemeli miyim ikilemini yaşamaktadır. Ardından yaşanacak şok ile korku duygusu tetiklenmekte ve bu kez piyasa hızla tersine dönmektedir (Loewenstein vd., 2001).

Bu süreç, finansal piyasalarda gözlenen korku–açgözlülük salınımının temel mekanizmasıdır. CNN Money’nin geliştirdiği Fear & Greed Index bu döngüyü nicel olarak ölçmeye çalışan bir göstergedir. Endeks, piyasa katılımcılarının duygusal yönelimlerini yansıtarak korku evresinde düşük, açgözlülük evresinde yüksek değerler alır (CNN Business, 2024).

Tuckett (2011), bu duygusal çöküşü fantastik nesnelerin kaybı olarak tanımlamaktadır. Yatırımcılar, piyasalarda hayal ettikleri başarı hikayeleriyle özdeşleşirler; ancak piyasa yön değiştirdiğinde bu hayal kırıklığı, duygusal bir travmaya dönüşmektedir. Bu durum, irrasyonel satışlar, portföy tasfiyesi ve likidite krizleriyle sonuçlanabilmektedir. Korku duygusu, kısa sürede bireysel bir tepkiden kitlesel paniğe dönüşür ve bu durum duygusal bulaşmanın klasik bir örneğini oluşturmaktadır (Hatfield, Cacioppo & Rapson, 1994).

3.4. Korku-Açgözlülük-Kaygı Döngüsünün Sistemik Sonuçları

Bu üçlü duygusal dinamik yalnızca bireysel yatırımcı davranışlarını değil, finansal sistemin genel istikrarını da etkilemektedir. Özellikle volatil dönemlerde, yatırımcıların duygusal tepkileri finansal piyasalarda amplifikasyon etkisi yaratmakta, küçük fiyat hareketleri, kolektif duygularla birleşerek büyük dalgalanmalara dönüşmektedir (Akerlof & Shiller, 2009).

Açgözlülük evresinde kredi genişlemekte, borçlanma artmakta ve varlık fiyatları şişmektedir. Korku evresinde ise bu eğilim tersine dönmekte riskten kaçınma, sermaye çıkışları ve likidite krizleri baş göstermektedir. Kaygı evresi, bu iki uç arasında geçici bir denge sunar; yatırımcılar yeniden bilgi toplamaya, belirsizliği azaltmaya çalışır. Ancak döngü tamamlandığında, sistem genellikle önceki denge noktasına değil, daha düşük bir istikrar düzeyine ulaşır (Kindleberger & Aliber, 2011).

Bu nedenle davranışsal finans yaklaşımı, piyasa döngülerini yalnızca ekonomik dalgalanmalar olarak değil, duygusal rejimler olarak da yorumlamayı önerir. Korku, açgözlülük ve kaygı; sırasıyla piyasanın “daralma”, “genişleme” ve “geçiş” fazlarını temsil eden duygusal göstergelerdir. Bu duygular arasındaki geçişlerin anlaşılması, finansal istikrarsızlığın psikolojik kökenlerini çözümlemede kritik öneme sahiptir.

4. DUYGULARIN FİNANSAL KARAR MODELLERİNE ENTEGRASYONU

Finansal karar verme süreçlerinin uzun süre yalnızca bilişsel rasyonalite çerçevesinde modellenmiş olması, duyguların sistematik etkisini büyük ölçüde göz ardı etmiştir. Ancak 20. yüzyılın sonlarından itibaren hem psikoloji hem nöroekonomi literatüründeki bulgular, duyguların karar süreçlerinde ayrılmaz bir bileşen olduğunu göstermiştir (Loewenstein & Lerner, 2003). Günümüzde finansal karar modelleri, yalnızca olasılık hesaplarına dayalı rasyonel tahminleri değil, duygusal değerlendirmeleri de hesaba katan hibrit yapılara doğru evrilmiştir.

Bu bölüm, duyguların finansal karar modellerine nasıl entegre edildiğini açıklamakta ve duygusal kestirme, duygusal tahminleme ve duygusal finans yaklaşımı olmak üzere üç temel yaklaşımı ele almaktadır.

4.1. Duygusal Kestirme

Duygusal kestirme, bireylerin karar verirken bilişsel hesaplamalardan çok duygusal izlenimlerine dayandıklarını öne süren bir yaklaşımdır. Slovic ve arkadaşlarına (2002) göre bireyler, bir finansal varlığın risk ve getiri profiline ilişkin değerlendirmelerini çoğu zaman nasıl hissettiklerine göre yapmaktadır. Bu nedenle iyi hissettiren yatırımlar daha az riskli, rahatsız edici yatırımlar ise daha tehlikeli olarak algılanmakta ve bu durum, rasyonel risk-getiri ilişkisinin tersine dönmesine yol açabilmektedir.

Finansal bağlamda duygusal kestirme, yatırımcıların marka, sektör veya ülke imajına ilişkin duygusal tepkilerinin yatırım kararlarını etkilediğini göstermektedir (Finucane vd., 2000). Örneğin, teknolojik yeniliklere veya çevreci projelere karşı olumlu duygular, yatırımcıların bu alanlardaki riskleri hafife almasına neden olabilmektedir. Bu durum, ESG (Çevresel, Sosyal, Yönetişim) yatırımlarında sıkça gözlemlenen bir ahlaki tatmin etkisidir (Statman & Glushkov, 2009).

Duygusal kestirme, aynı zamanda kısa vadeli piyasa hareketlerinde yatırımcı tepkilerini açıklamakta da yararlıdır. Günlük haber akışına verilen aşırı tepkiler, çoğu zaman bilişsel analizden çok duygusal tepkilerle şekillenmektedir (Luce, Bettman & Payne, 1997). Dolayısıyla duygusal kestirme, finansal modellerde duyguların bilgi işleme üzerindeki kısayol etkisini temsil etmektedir.

4.2. Duygusal Tahminleme

Loewenstein ve arkadaşlarının (2001) geliştirdiği bu yaklaşım, kararların yalnızca bilişsel tahminler ile değil, aynı zamanda duygusal öngörüler tarafından da yönlendirildiğini ileri sürmektedir. İnsanlar gelecekteki olaylara dair yalnızca olasılıkları değil, o olaya ilişkin nasıl hissedeceklerini de tahmin etmeye çalışırlar. Bu süreç, duygusal tahminleme olarak adlandırılmaktadır.

Finansal kararlar açısından bu yaklaşım oldukça önem taşımaktadır; çünkü yatırımcılar genellikle gelecekteki kazançların veya kayıpların duygusal etkisini yanlış tahmin ederler. Örneğin, yatırımcılar olası kayıpların yaratacağı duygusal acıyı olduğundan fazla, kazançların yaratacağı mutluluğu ise olduğundan az tahmin edebilmektedir (Wilson & Gilbert, 2003). Bu yanlış tahmin, uzun vadede aşırı temkinli ya da aşırı riskli portföy tercihlerine neden olabilir.

Duygusal tahminleme hataları, piyasa balonları ve kriz dönemleri gibi aşırı duygusal ortamlarda daha da belirginleşmektedir. Tuckett (2011), yatırımcıların geleceğe ilişkin beklentilerini yalnızca ekonomik verilere değil, aynı zamanda fantastik nesneler olarak adlandırdığı duygusal yatırım hikayelerine dayandırdıklarını belirtmiştir. Yani yatırımcı, gelecekteki duygusal tatmini zihninde kurgulamakta, bu kurgular da kararlarını yönlendirmektedir. Bu yönüyle duygusal tahminleme, finansal modellerde duyguların beklentiler üzerindeki öngörüsüz etkisini açıklamaktadır.

4.3. Duygusal Finans

Duygusal finans; davranışsal finansın duygusal boyutunu daha derin psikodinamik temellerle açıklamaya çalışan yaklaşım olarak tanımlanmaktadır. Tuckett ve Taffler (2008), finansal kararları yalnızca bilişsel önyargılarla değil, aynı zamanda bireylerin bilinçdışı arzuları, korkuları ve özdeşleşmeleriyle açıklamayı önermektedir.

Bu yaklaşıma göre yatırımcılar, piyasada işlem yaptıkları varlıklarla duygusal bağlar kurmaktadır ki söz konusu varlıklar yalnızca ekonomik nesneler değil, aynı zamanda fantastik nesnelerdir. Bu nesneler yatırımcı için güven, güç veya aidiyet hissini temsil eden nesnelerdir (Tuckett, 2011). Bu nedenle yatırımcılar, kayıpları yalnızca finansal bir sonuç olarak değil, benliklerine yönelik bir tehdit olarak algılamaktadır.

Duygusal finans yaklaşımı, piyasalarda görülen kitlesel coşku veya panik durumlarını duygusal anlatılar çerçevesinde yorumlamaktadır. Piyasadaki anlatılar, bireysel yatırımcıların içsel psikodinamik süreçleriyle birleşerek kolektif bir duygusal yönelim oluşturmaktadır. Bu durum, rasyonel balon kavramının ötesinde, duygusal balonların da varlığını açıklamaktadır (Akerlof & Shiller, 2009).

Duygusal finansın önemli katkılarından biri, finansal kurumların karar kültürüne de duygusal farkındalık perspektifini kazandırmasıdır. Portföy yöneticileri, analistler ve yatırımcı ilişkileri profesyonelleri için duyguların bastırılması değil, tanınması ve yönetilmesi önerilmektedir. Bu nedenle Tuckett (2011), duygusal zeka kavramının finansal karar kalitesiyle doğrudan ilişkili olduğunu savunmaktadır.

Son yıllarda geliştirilen hibrit modeller, duyguların finansal karar süreçlerine nicel biçimde entegre edilmesini hedeflemektedir. Loewenstein (2000) tarafından önerilen model fayda fonksiyonuna duygusal değer bileşeninin eklenmesini öngörmüştür. Bu modele göre yatırımcı, yalnızca parasal kazancı değil, duygusal tatmin veya rahatsızlık derecesini de karar fonksiyonuna dahil etmektedir.

Benzer şekilde Nöroekonomik Karar Modeli (Bechara & Damasio, 2005), beyin aktiviteleriyle duygusal tepkileri ilişkilendirerek, duyguların rasyonel seçim modellerine biyolojik bir temel kazandırmıştır. Bu modeller, finansal davranışları açıklarken "duyguların gürültü değil, bilgi kaynağı" olduğunu ileri sürmektedir.

Sonuç olarak, duyguların finansal karar modellerine entegrasyonu, klasik rasyonel paradigmadan önemli bir sapmayı temsil etmektedir. Ancak bu sapma, irrasyonelliğin değil, insan doğasının bütüncül bir biçimde ele alınmasının göstergesini oluşturmaktadır. Günümüz finansal sistemleri, yatırımcı davranışlarını anlamak ve sistemik riskleri azaltmak için artık yalnızca sayılara değil, duygulara da kulak vermek zorundadır.

5. SONUÇ VE DEĞERLENDİRME

Finansal karar verme süreçleri uzun yıllar boyunca rasyonel beklentiler, bilgi verimliliği ve matematiksel modeller çerçevesinde açıklanmaya çalışılmıştır. Ancak son otuz yılda yapılan ampirik ve deneysel araştırmalar, bu yaklaşımın insan davranışının bütüncül doğasını yansıtmada yetersiz kaldığını göstermiştir. Davranışsal finans, bu eksikliği gidermek üzere bilişsel önyargıların yanı sıra duyguların da finansal kararlar üzerindeki etkisini inceleyen disiplinlerarası bir alan olarak ortaya çıkmıştır (Shefrin, 2000; Akerlof & Shiller, 2009).

Bu çalışmanın odak noktası olan duyguların finansal kararlardaki rolü, literatürde giderek artan bir şekilde rasyonelliğin tamamlayıcısı olarak ele alınmaktadır. Özellikle korku, açgözlülük ve kaygı gibi temel duygular, finansal piyasalardaki döngüsel dinamikleri anlamada merkezi bir konuma sahiptir. Tuckett (2011) ve Shiller (2015), piyasalardaki dalgalanmaların yalnızca ekonomik göstergelere değil, aynı zamanda yatırımcıların kolektif duygusal durumlarına da dayandığını ileri sürmektedir. Bu çerçevede finansal sistem, ekonomik bir ağ olduğu kadar duygusal bir ekosistem olarak da tanımlanabilmektedir.

Davranışsal finansın duygusal boyutuna ilişkin duygusal kestirme, duygusal tahminleme ve duygusal finans yaklaşımları finansal karar modellerine yeni bir perspektif kazandırmıştır. Bu yaklaşımlar; bireylerin çoğu zaman kararlarını bilişsel analizden çok duygusal sezgilere dayanarak verdiğini (Slovic vd., 2002), gelecekteki olaylara ilişkin duygusal beklentilerin kararların kalitesini sistematik biçimde etkileyebileceğini (Wilson & Gilbert, 2003) ve finansal piyasaların yalnızca bilgiye değil, duygusal anlatılara da tepki verdiğini (Tuckett & Taffler, 2008) göstermektedir.

Bu bağlamda duygular, yatırımcı davranışını yönlendiren irrasyonel sapmalar değil, karar süreçlerinde uyum sağlayıcı işlevler gören psikolojik araçlardır. Loewenstein ve Lerner'in (2003) belirttiği gibi, duygular; bireylerin riskleri değerlendirme, fırsatları algılama ve belirsizlikle başa çıkma biçimlerini düzenleyen birer duygusal sinyal sistemi olarak işlev görmektedir. Dolayısıyla finansal karar modellerine duygusal bileşenlerin eklenmesi, rasyonel çerçeveden bir sapma değil, insan doğasının daha gerçekçi bir temsilidir.

Bununla birlikte, duyguların finansal kararlara entegrasyonu henüz tam anlamıyla nicel modellere yansıtılamamıştır. Duyguların ölçülmesi, modellenmesi ve simülasyonu konularında metodolojik zorluklar devam etmektedir. Özellikle nörofinans alanında yapılan çalışmalar (Bechara & Damasio, 2005), beyin süreçleriyle duygusal tepkiler arasındaki bağlantıları anlamada önemli ilerlemeler sunsa da, bu bulguların makro düzeyde finansal modellere entegre edilmesi hala sınırlıdır.

Gelecekteki araştırmalar açısından üç temel yön öne çıkmaktadır. İlk olarak, finansal piyasalarda duygusal eğilimlerin anlık olarak ölçülmesine yönelik geliştirilen duygusal endeksler yatırımcı psikolojisinin dinamik boyutunu yakalamada önemli araçlar sunmaktadır. Ancak bu endekslerin teorik temellerinin güçlendirilmesi ve kültürel farklılıklar bağlamında yeniden değerlendirilmesi gerekmektedir. Bunun yanı sıra, davranışsal finans ile nöroekonomi modellerinin bütünleştirilmesi, duyguların karar fonksiyonlarına nasıl dahil edilebileceğini açıklamada yeni bir paradigma oluşturabilir. Bu doğrultuda, Loewenstein'in (2000) önerdiği model benzeri yaklaşımlar gibi hibrit yaklaşımlar, rasyonel ve duygusal bileşenlerin aynı çerçevede ele alınmasına olanak tanımaktadır. Son olarak, finansal kurumlarda karar vericilerin duygusal farkındalık düzeylerinin artırılması, risk yönetimi ve yatırım stratejilerinde daha dengeli karar süreçlerinin oluşturulmasına katkı sağlayabilmektedir. Bu bağlamda duygusal zeka ve psikolojik dayanıklılık kavramlarının finansal yönetim kültürüne entegre edilmesi, hem bireysel hem de kurumsal düzeyde daha sürdürülebilir bir finansal davranış yapısının oluşmasını destekleyecektir (Tuckett, 2011).

Sonuç olarak, duygular finansal davranışın hatalı unsurları değil, anlamlandırıcı bileşenleridir. Finansal kararlar, bilişsel hesaplamalar ile duygusal sezgiler arasındaki etkileşimin ürünüdür. Bu nedenle davranışsal finansın geleceği, bu iki boyutu bütünleştiren daha insani bir ekonomi anlayışında yatmaktadır. Shiller'in (2015) vurguladığı gibi, piyasalardaki "irrasyonel coşku" ancak duygusal mantığıyla birlikte anlaşıldığında anlam kazanır. Finansı anlamak, temelde insanı anlamaktır zira her fiyat, her grafik ve her dalgalanma, insan duygularının izlerini taşımaktadır.

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