WHY UKRAINIANS DELAY PAYING ELECTRICITY BILLS

by

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LIST OF ABBREVIATIONS

NEURC National Energy and Utilities Regulatory Commission

OLS Ordinary Least Squares

kWh kilowatt hour

UAH Ukrainian hryvnia

DSO Distribution System Operator

PUP Universal Service Providers

PVC Free Price Suppliers

PON Supplier of Last Resort

SSC State Statistics Committee

UK United Kingdom

CAWI Computer-Assisted Web Interviewing

SMS Short Message Service

CHAPTER 1. INTRODUCTION

Paying electricity bills is one of the many regular tasks that each of us does every month. However, how many of us actually pay them on time, and does it really matter?

This question has become more relevant in Ukraine recently. Electricity costs have nearly doubled in the past year from 2.64 UAH to 4.32 UAH per kWh making it much more difficult for many households to make their payments. By 2025 Ukrainians owed more than 17 billion UAH in unpaid electricity bills. There are few reasons that might have caused this situation. First, many families have seen a decline in their income because of the full-scale invasion of Ukraine. Additionally, the government temporarily prohibited power disconnections during the war allowing households to postpone payments without facing immediate repercussions. Many people had accrued months' worth of unpaid bills by the time this ban on Ukrainian-controlled territory was lifted in early 2024.

Late payments now affect the entire energy system in addition to households. Suppliers lose the money they require for upkeep, repairs, and future investments when bills are not paid on schedule. So, it's very important for homes and energy companies to know why payments are late and what they can do to get people to pay on time. The study concentrates on two main topics: the causes of payment delays and strategies to enhance individuals' motivation to pay electricity bills punctually. It looks into whether financial problems or bad habits like putting things off or forgetting to pay are the main reasons why payments are late. It also looks at what kinds of messages (social norms, gain framing, or loss framing) can get people to pay on time. The goal is to find useful information that can help families, suppliers, and policymakers make payments more regular and reduce stress in the energy sector.

The entire data that is used for this study was gathered via an online survey conducted in Ukraine. The survey presented both descriptive and experimental to the total number of 240 participants. Data on income, demographics, household attributes, and behavioural tendencies such as procrastination, forgetfulness and perceived bill burden was collected using the descriptive section. Meanwhile the experimental part assessed the difference between massages in motivating people to pay their electricity bills on time

Randomly differentiated into three groups participants were presented with one of three short SMS reminders: a gain-framed message offering a discount for early payment, a loss-framed message alerting about a fine for late payment, or a social norm message informing that the majority of people in their area had already paid. Respondents specified how much the massage would encourage them to make their payments on time after reading i on a scale of 1 to 10. This way it was possible to analyze both who has a tendency to pay late and what kind of message can encourage people to make payments on time

The findings of the study showcase that both behavioural and financial factors add to the delay of electricity payments in Ukraine. Even with enough money on their hands, some people postpone payments out of the habit of procrastination, while people with children, larger bills, or mortgages often face extreme financial strain. In accordance with the behavioural messaging experiment, positive, gain-framed messages that accentuate on the advantages of early payment are the most successful at motivating people to take action.

Based on these findings, the study suggests that energy companies should look for ways to encourage timely payments, even though electricity tariffs are set by the government. If financial discounts cannot be offered, energy suppliers can still use other ways to encourage timely payments. They may give small symbolic rewards, mention reliable payers in newsletters, or hold small lotteries for those who pay on time or manage to

reduce their debt. These kinds of actions make the payment process more interesting and can motivate people who usually delay their bills.

CHAPTER 2. INDUSTRY OVERVIEW AND RELATED STUDIES

2.1 Industry overview

Until the middle of 2019, Ukraine's electricity market used a centralized system. Energorynok, a state-owned company, was the only one that could buy electricity from all power plants. It then sold it to regional distributors (oblenergos) that delivered it to homes and businesses. Payments were supposed to go back up the chain, but in reality, money often got stuck. Because of these delays, Energorynok owed more than 30 billion UAH by the summer of 2019 (BBC 2019). The system didn't work well. One company handled all the transactions, payments were late, and producers often didn't get paid. This showed that the market needed big changes to make money move more freely and clearly.

The Law on the Electricity Market was imposed to solve the situation. From July 1, 2019, Energorynok was shut down and electricity could be sold directly from producers to suppliers, traders, and end users (BBC 2019). The reform was meant to make transactions simpler, lower risks, and improve payment discipline in the sector.

After the new law was imposed the retail electricity market in Ukraine was reorganized into two parts. Each consumer now signs one contract with the Distribution System Operator (DSO), which manages the local network and records consumption and another contract with a chosen supplier. Suppliers exist in three forms: Universal Service Providers (PUP) that sell electricity at regulated tariffs in their region, Free Price Suppliers (PVC) who compete on the open market, and a Supplier of Last Resort (PON), which guarantees temporary supply if no other contract is active but at a higher cost (NEURC 2021).

As of now Ukrainians can choose their electricity supplier, but the price they pay is mostly set by the state. Since June 2024, the main household tariff has been 4.32 UAH per kWh, which is almost double the earlier price of 2.64 UAH/kWh (NEURC 2024). This increase made monthly bills much higher for many families. Some consumers use special meters that give cheaper night tariffs. With a dual-zone meter, the night price is 2.16 UAH/kWh, and with a tri-zone meter it can be as low as 1.728 UAH/kWh. At the same time, the tri-zone meter has very high peak prices, up to 6.48 UAH/kWh (YASNO), which is more than half higher than the normal tariff.

Recent surveys from the World Bank show that electricity expenses have become a serious problem for many Ukrainian households. The "Listening to Citizens of Ukraine" survey shows that the average monthly payment for electricity increased from about 474 UAH at the end of 2023 to more than 800 UAH by the end of 2024, The highest average bills were in the west of the country, where they were nearly 900 UAH (World Bank 2024). This rapid growth in expenditures shows how electricity now represents a bigger percentage of family income. Electricity prices have gone up quickly, and now they take up a bigger part of household budgets. A lot of families, especially those with low incomes, have trouble paying their electricity bills on time, which can be bad for their health. We need to look more closely at how households use electricity to understand how this affects their finances.

The State Statistics Service of Ukraine (SSC, 2020) reported that households use electricity mainly for lighting and appliances, which account for 68.5% of total electricity consumption. The next largest uses were cooking (12.1%) and water heating (10.4%). Space heating (5.7%) and space cooling (3.1%) accounted for a smaller share of total consumption.

To sum up, many Ukrainian households still depend on gas, solid fuels, or district heating for heating needs, while electricity is primarily used for appliances and daily

tasks. At the same time, as cooking and water heating comprise more than a fifth of this total, and also account for several electrical demands to operate, the potential to reduce electricity use within households will not be easy without reducing comfort levels.

Consumers are required to pay their electricity bill within a minimum 10 working days after receiving the invoice unless another deadline is indicated in the supply contract. In any case, the payment deadline must be within a maximum of 20 calendar days after the end of the billing cycle (SIESU). If the consumer fails to meet the payment deadline, the supplier may issue a notice of disconnection, which is required to be given at least 10 working days in advance of disconnecting the supply. Consumers are subject not just to disconnection but to any further fees as well. In accordance with the Law on Housing and Utility Services, late payments are subject to a "fine" (penia) of up to 0.01% of the overdue amount for each day of delay, with a 100% cap as the total penalty (NUERC, 2024).

According to the State Statistics Service of Ukraine (SSC 2025), household debt for utilities reached 106.6 billion UAH in the second quarter of 2025, compared to 81.3 billion UAH at the end of 2021. The largest debts were for district heating and hot water (35.2 billion UAH) and natural gas (32.3 billion UAH). Notably, electricity debt alone was 17.1 billion UAH, making it the third-largest category of unpaid services. Households also owed 10.2 billion UAH for cold water, 8.8 billion UAH for building management, and 3.1 billion UAH for waste collection (SSC, 2025).

This growth in debt is moderate in comparison to the increase in tariffs, especially since electricity prices almost doubled in 2024. Initially, during the war, being unable to disconnect utilities and enforce penalties for non-payment provided some level of protection, but that protection was eliminated in early 2024, meaning households can now, again, face penalties and disconnection for missed utility payments (Cabinet of Ministers of Ukraine 2023). It is important to note that

electricity and cold water were not covered under the freeze on tariffs, which in part, explains the higher levels of debt in these categories.

According to YASNO (2023), one of the largest electricity suppliers in Ukraine, payment discipline in Kyiv has worsened in recent years. As of December 1, 2023, more than one million customers in the capital had payments not made on time, and total debt across the customer base has approached 1 billion UAH. Approximately 130,000 households had debts of more than three months and most customers were using approximately up to 250 kWh. A smaller group of about 19,000 households used 250–500 kWh, and roughly 7,000 households consumed more than 500 kWh monthly.

When it comes to disconnected cases, the average debt level has actually declined: in Q1 2024, disconnected customers owed about 10,800 UAH and by Q1 2025 that amount dropped to 7,000 UAH. At the same time, more customers made payments of all outstanding debts in advance of reconnection after being disconnected. For example, in Kyiv only, households paid 8.6 million UAH for reconnections early in 2025 (YASNO 2025). This case illustrates how stricter enforcement mechanisms can change household behavior and why timely payments are essential for suppliers' financial stability.

2.2 Related studies on electricity bills payments

Additionally, I want to look at what other studies have already found about electricity payments.

Utility arrears are directly related to affordability, according to earlier research on transition economies. In many Eastern European and Central Asian nations, energy and water expenses account for a disproportionately high amount of household income, forcing poor households into what is commonly referred to as "energy poverty," according to Fankhauser and Tepic (Fankhauser and Tepic, 2006).

Fankhauser, Rodionova and Falcetti (2008) found payment arrears in Ukraine to be caused by low household incomes, weak enforcement, and poorly targeted subsidies. Even when subsidies were meant to help vulnerable households, some richer households got them, the authors note, and many low-income households continued to struggle to make payments. They refer to this perennial challenge as a "culture of arrears," which stems from low affordability and weak institutional discipline.

Setup of electricity billings can determine how households manage their payments. The billing model consists of two significant billing models — postpaid billing (where people use electricity, paying after consuming it), and prepaid billing (where they pay for them ahead of time). With postpaid models only available in Ukraine, households can delay payment if needed. We can learn about how different billing models affect consumer behavior by examining how prepaid systems operate in other countries.

Previous studies have demonstrated that prepaid billing leads to fewer late payments as electricity is supplied only after the payment is made. In South Africa, prepaid meters reduced arrears and improved reliability of revenue collection for utilities, according to Jack and Smith (Jack and Smith, 2020). They also said prepaid plans have helped prevent long-term debt by prompting households to schedule payments according to income. Yet the 2022 energy crisis in the UK displays some downsides. Even with more prepaid meters, a number of households experienced "self-disconnection" and had a hard time adding credit (Uswitch, 2022). This indicates how, although prepaid systems can aid with payment arrears, they can also exert additional strain on vulnerable households.

The billing system affects both when people pay and how much electricity they use. When households pay in advance, they notice the cost right away and often use electricity more carefully. Jack and Smith (Jack and Smith, 2020) also found that South African households with prepaid meters used less electricity overall, not just

because of fewer arrears. In short, when money is limited, prepaid users adjust their usage to fit their income, which can sometimes lower their quality of life.

The billing system influences not only when people pay but also how much electricity they consume. When households pay for electricity upfront, they see the cost right away and tend to use less. According to Jack and Smith (Jack and Smith, 2020), South African households with prepaid meters reduced their arrears and reduced their use of electricity. However, prepaid users often adjust their usage to match their income, reducing their welfare when people have less money. According to a recent experiment by Werthschulte, households on a pay-as-you-go plan manage their electricity better using less of it, while on the other hand, the postpaid users use a lot and take longer to pay (Werthschulte, 2023).

These conclusions are incredibly relevant in Ukraine, where the system is entirely postpaid. That demonstrates not just whether households can afford electricity, but also how the billing system works, when you think about late payments. Getting everybody on prepaid meters could reduce arrears but could put vulnerable families at serious risk, particularly during the time of war.

Other researchers researched auto bill payment. What they have also discovered is that autopay prevents households from paying late payments by eliminating the risk of forgetting (Delgado Fuentealba, Muñoz Mendoza, Sepúlveda Yelpo, Veloso Ramos, and Fuentes-Solís, 2021). However, autopay does have the potential of making people pay for things they don't use as closely, because they don't check the next bill like a watch-dog. In Ukraine, for which a significant proportion of the consumers still pay manually, implementing or encouraging autopay may serve as a simple behavior modification tool for better payment discipline. That, though would also need to be weighed against the threat of less transparency and less control over spending.

2.3 Related studies on electricity bills payments

A research by Barboni, Cardenas, and de Roux (Barboni, Giorgia, Juan Cardenas, and Nicolás de Roux, 2022) found out that short messages can help people pay their debts on time. Researchers ran an experiment with over 7,000 bank clients in Colombia who were behind on their payments. Various SMS reminders were sent to the clients including ones about reciprocity, moral obligation, and social norms. The social norm message of "the majority of people in your area have already paid" performed the best. On top of that these messages decreased late payments by about 4%. People who were already making their payments on time, however, did not alter their behaviour as a result of the messages. This indicated that nudges are more effective for people who are just a little bit late than for people who never or always make their payments on time.

Similar concepts were tested by researchers in the Netherlands (Migchelbrink, Koen, Peter Verhoef, and Kees van den Bos, 2023). They experimented with various behavioural nudges and looked at how to get people to pay their parking fines on time. They discovered that nudges, such as reminders combined with moral or social messages, were more effective than using just one message.

Many studies demonstrate that minor interventions like reminder messages or social norm cues can successfully alter people's behaviour without financial incentives. A similar methodology is used in my study, which tests various message framings to determine which one best encourages timely payment of electricity bills.

CHAPTER 3. METHODOLOGY

The experimental design of this research follows common procedures in survey-based experiments and behavioral economics. A clean comparison of average effects between groups was made possible by randomly assigning each participant to one treatment group and having them evaluate only one message. This method assists in separating the message's impact from individual behavioral or demographic variations. In the study Civilian Evacuation During War: Evidence from Ukraine (Martinez et al., 2022) researchers used a similar between-subject experimental design, randomly assigning respondents to various message framings in order to assess their impact on decision-making. In line with this reasoning, my research uses the same methodology to examine the impact of alternative message framings on people's motivation to make on-time electricity bill payments.

In May 2024, an online experiment was conducted in Ukraine with 240 participants (178 women and 62 men). The research firm Info Sapiens' nationwide online panel was used to recruit participants in accordance with its standard CAWI (Computer-Assisted Web Interviewing) protocols. A total of 3,500 individuals received invitations on their phone. Participants needed to have a separate electricity meter or account, be at least eighteen years old, be fully or partially responsible for paying electricity bills and have lived at their current address for at least six months in order to be eligible. Completing the survey took roughly ten to twelve minutes on average. After completing the questionnaire, each respondent received 50 UAH as compensation, which was credited to their mobile phone balance.

The purpose of the experiment was to determine how various messages might affect people's motivation to make on-time electricity bill payments.

The survey was implemented by an external research company. During the setup phase, a misunderstanding in their design process led to the omission of a control

group. As a result, all respondents were randomly assigned to one of three message treatments, but none received a “no-message” version. The analysis therefore focuses on comparing the relative effectiveness of the three messages rather than estimating an absolute treatment effect.

Each of the three treatments was assigned to participants at random. At the end, there were 3 treatment groups: 85 respondents gain frame, 79 respondents social norm, 76 respondents loss frame. In the experiment, participants first read a short situation:

“Imagine you just received this SMS reminder about your electricity bill.”

Then each person was randomly shown one of the following three messages:

Treatment 1 – Social Norm:

“Your electricity payment is due in 5 days. 85% of households in your area have already paid their bill this month.”

Treatment 2 – Loss Frame:

“Your electricity payment is due in 5 days. You will be charged a 5% penalty if you pay after this date.”

Treatment 3 – Gain Frame:

“Your electricity payment is due in 5 days. You will receive a 5% discount if you pay before this date.”

After reading the message, respondents answered one question:

“On a scale from 1 to 10, how much would this message motivate you to pay your bill on time?” (1 = Would not motivate me at all; 10 = Would strongly motivate me to pay on time.)

The motivation score, which indicates how much the message influences a person's willingness to make a payment on time, is the primary variable in this experiment.

The independent variable is the type of treatment (gain, loss, or social norm). The objective was to determine which type of message provides the most motivation.

Two primary behavioral theories were tested by this design: whether people respond more to rewards or penalties (framing effect) and whether people are more likely to act if they are aware of what other people are doing (social norm effect). Because everyone saw only one message and the groups were assigned randomly the differences in motivation can be connected to the message itself and not to personal differences between participants. Since Ukrainian utility companies frequently use mobile notifications to communicate with customers, the usage of SMS messages reflects a real-world context.

Next, to identify which factors best explain payment delays of electricity bills, I constructed an OLS (Ordinary Least Squares) regression model. I eliminated all variables that were not statistically significant ($p > 0.05$) using backward elimination prior to running the model. By keeping only predictors that significantly explain payment delays, this step helped to simplify the model.

Several variables were included as dummy variables to capture differences between groups. For example, postponement reasons (only when money is tight, occasionally, or often) and housing status (own, mortgage, or employer-provided) were converted into binary form. In this way the model can compare each group to a reference category using this method.

The final model is as follows:

$$Late\ payment_1 = \beta_0 + \beta_1(Procrastination\ frequency)_i + \beta_2(Postpone\ only\ when\ short\ on\ money)_i + \beta_3(Children\ under\ 18) + \beta_4(Housing\ mortgage)_i + \beta_5(Housing\ employer\ provided)_i + \beta_6(Monthly\ Bill)_i + \beta_7(Postpone\ sometimes)_i + \beta_8(Region\ East)_i \beta_9(Payment\ method\ transfer\ to\ someone)_i + \varepsilon_i$$

CHAPTER 4. DATA

4.1 Sample Characteristics

4.1.1 Demographic Profile

The sample includes different regions, settlement types, and household characteristics. The average age of respondents is 38 years, and about three quarters are women. Most participants live in big cities (42%), while the rest are spread between medium and small cities, rural areas, and urban-type settlements. More than half of respondents are full-time employed, 21% work part-time, and 13% are unemployed. Household income is mostly between 10,000–20,000 UAH (30%) and below 10,000 UAH (25%). On average, households have 3.2 members, including about one child under 18.

The survey was conducted only in territories under Ukrainian control, so the East is less represented (6%). The largest shares come from the South (33%), Central (28%), and West (21%), while the North makes 13%. Regions are defined as follows: West – Volyn, Zakarpattia, Ivano-Frankivsk, Lviv, Rivne, Ternopil, Chernivtsi; East – Donetsk, Luhansk, Kharkiv; Central – Kyiv, Kirovohrad, Poltava, Cherkasy; South – Dnipropetrovsk, Zaporizhzhia, Mykolaiv, Odesa, Kherson; North – Vinnytsia, Zhytomyr, Sumy, Khmelnytskyi, Chernihiv. The dataset gives useful variation, but it is more urban and female, which should be considered in interpretation (see Table 1).

Table 1. Summary statistics of socio-demographic variables

Variable	N	Mean (Proportion)
Demographic		
Age	240	38,35
Gender (Female = 1)	240	0,742
Geographic Distribution		
West	51	0,212
East	15	0,062
Central	66	0,275
South	78	0,325
North	30	0,125
Settlement Type		
Large city (>500,000)	100	0,417
Medium city (100–500k)	58	0,242
Small city (<100k)	37	0,154
Urban-type settlement	17	0,071
Village/rural area	28	0,117
Employment Status		
Full-time employed	123	0,512
Part-time employed	50	0,208
Unemployed	30	0,125
Not working	4	0,017
Retired	13	0,054
Student	10	0,042
Military service	3	0,013
Household Monthly Income		
<10,000 UAH	59	0,246
10,000–20,000 UAH	72	0,3
20,000–30,000 UAH	52	0,217
30,000–50,000 UAH	36	0,15
50,000–70,000 UAH	11	0,046
>70,000 UAH	4	0,017
Prefer not to say	6	0,025
Household Structure		
Household size (mean)	240	3,24
Children under 18 (mean)	240	0,99

4.1.2 Household Economic Conditions

The survey also looked at household economic conditions, including housing, electricity costs, payment burden, and energy efficiency. Most respondents reside in apartments: 8% live in smaller apartment complexes, and 51% live in buildings with five floors or more. Only a small percentage (33%) reside in private homes, whereas the majority live in apartments, dorms, or other housing arrangements. Two-thirds of households (66%) are outright owners of their home. While renting from the government or employer housing is extremely rare, 13% of people live with family and 17% rent from private landlords.

Electricity spending is concentrated in the middle range. 31% of households report bills of 1,000–2,000 UAH per month, while nearly half (48%) pay 500–1,000 UAH. Just 14% spend less than 500 UAH, while 8% spend more than 2,000 UAH. When asked about the burden, almost half (48%) called their bills moderately burdensome, and about one quarter (23%) said they are very burdensome. Only small shares saw them as not burdensome (7%) or extremely burdensome (7%). Most households (87%) report using some kind of energy efficiency measures, while 8% do not, and 5% do so only partially (see Table 2). In conclusion, it demonstrates that although energy-saving techniques are widespread, the financial burden of electricity bills is not entirely alleviated by them.

Table 2. Summary statistics of household economic conditions

Variable	N	Mean (Proportion)
Housing Characteristics		
Apartment (5+ floors)	123	0,512
Apartment (up to 4 floors)	20	0,083
Private house	78	0,325
Part of house	14	0,058
Dormitory	4	0,017
Other	1	0,004
Housing Ownership		
Own outright	158	0,658
Own with mortgage	2	0,008
Rent from private	41	0,171
Rent from government	5	0,021
Employer provided	2	0,008
Live with family	30	0,125
Other	2	0,008
Electricity Costs		
Monthly bill <500 UAH	34	0,142
Monthly bill 500–1,000 UAH	114	0,475
Monthly bill 1,000–2,000 UAH	74	0,308
Monthly bill >2,000 UAH	18	0,075
Perceived Bill Burden		
Not burdensome	16	0,067
Slightly burdensome	36	0,15
Moderately burdensome	116	0,483
Very burdensome	56	0,233
Extremely burdensome	16	0,067
Energy Efficiency Adoption		
Yes	209	0,871
No	18	0,075
Partially	13	0,054

The cross-tabulation of perceived electricity bill burden and income reveals that many households, not just the poorest, struggle with electricity costs. About three out of four households (76%) in the lowest income group (under 10,000 UAH) consider their bills to be moderately or very burdensome, and a small percentage (8%) even describe them as extremely burdensome. Four out of five (80%) people with incomes between 10,000 and 20,000 UAH also say that bills are a financial burden. The only respondents (50%) who claim that their bills are not burdensome are those in the highest income bracket, which is over 70,000 UAH (see Table 3). This implies that while affordability issues impact a large portion of the population, they are most severe for households with lower incomes.

Table 3. Perceived bill burden by household income

Income (UAH)	Not burdensome	Slightly burdensome	Moderately burdensome	Very burdensome	Extremely burdensome	Total
<10,000	7% (4)	8% (5)	39% (23)	37% (22)	8% (5)	59
10-20,000	4% (3)	11% (8)	56% (40)	24% (17)	6% (4)	72
20-30,000	8% (4)	13% (7)	50% (26)	23% (12)	6% (3)	52
30-50,000	6% (2)	28% (10)	53% (19)	8% (3)	6% (2)	36
50-70,000	9% (1)	27% (3)	45% (5)	0% (0)	18% (2)	11
>70,000	50% (2)	50% (2)	0% (0)	0% (0)	0% (0)	4

Color Scale: 0% 20% 40% 60% 80% 90%+

Energy efficiency adoption is also linked to housing type. In apartments, both high-rise and smaller buildings, around nine in ten households (89–90%) report adopting efficiency measures. This also holds true for private residences (85%) and house components (93%). Dormitory adoption, on the other hand, is the lowest: only 25% of residents report using energy-saving measures, while 75% do not (see Table 4).

This suggests that whether households can adopt efficiency practices depends on the type of building and living conditions.

Table 4. Energy efficiency adoption by housing type

Housing Type	Yes	No	Partially	Total
Apartment (5+ floors)	89% (110)	5% (6)	6% (7)	123
Apartment (<5 floors)	90% (18)	0% (0)	10% (2)	20
Private house	85% (66)	12% (9)	4% (3)	78
Part of house	93% (13)	0% (0)	7% (1)	14
Dormitory	25% (1)	75% (3)	0% (0)	4

Color Scale: 0% 20% 40% 60% 80% 90%+

Electricity bills also vary by settlement type. In large and medium cities, about half of households (48–52%) report monthly costs between 500–1,000 UAH, with smaller groups paying less or more. Higher bills are more prevalent in rural and small city areas: over four out of ten households in rural areas (43%) and nearly four out of ten households in small cities (38%) pay 1,000–2,000 UAH. Urban settlements are more divided: one in eight households (12%) report bills exceeding 2,000 UAH, while some households pay very little (6%) and others pay very little (see Table 5). This shows that household energy costs depend on both the size and type of living area.

Table 5. Monthly Electricity Bill by Settlement Type

Settlement	<500 UAH	500-1000 UAH	1000-2000 UAH	>2000 UAH	Total
Large city	14% (14)	48% (48)	30% (30)	8% (8)	100
Medium city	21% (12)	52% (30)	21% (12)	7% (4)	58
Small city	14% (5)	46% (17)	38% (14)	3% (1)	37
Urban settlement	6% (1)	47% (8)	35% (6)	12% (2)	17
Rural area	7% (2)	39% (11)	43% (12)	11% (3)	28

Color Scale: 0% 20% 40% 60% 80% 90%+

4.2 Payment Behavior Pattern

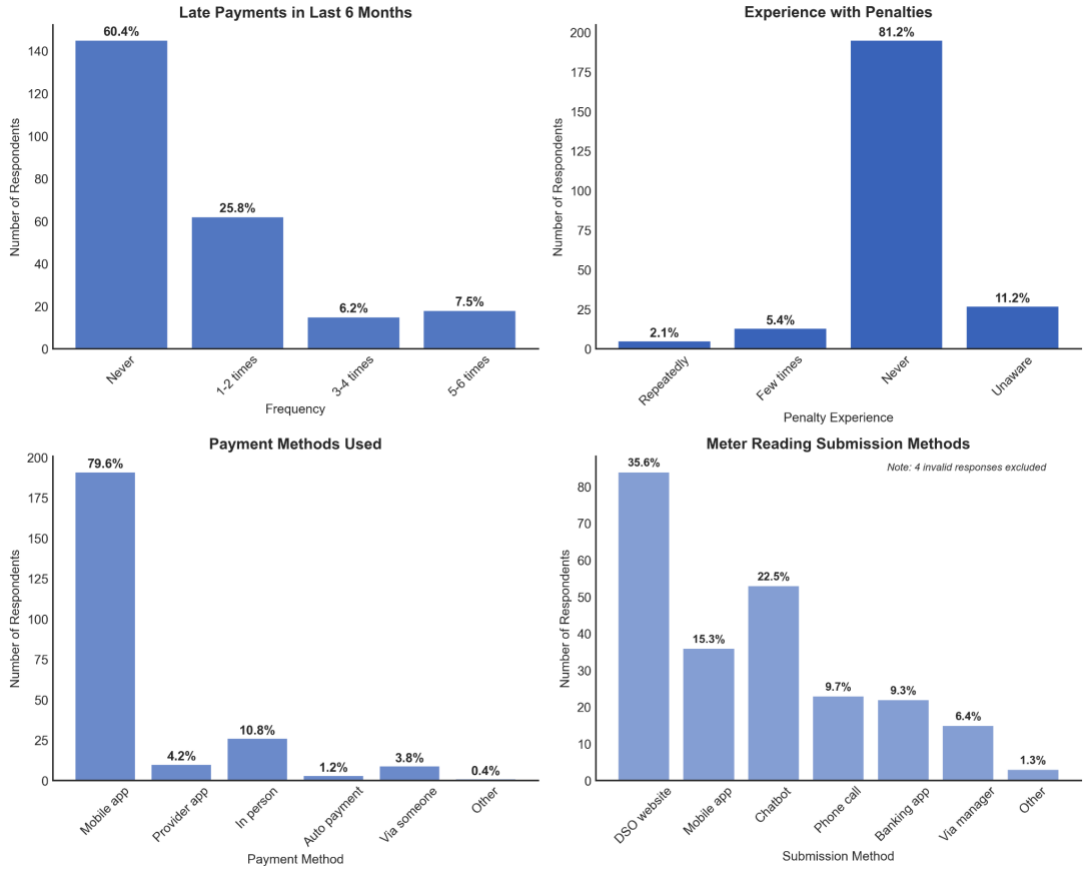
4.2.1 Payment Discipline

Important patterns in how Ukrainian households manage their electricity expenses can be seen by looking at payment discipline. While 26% of respondents reported only one or two late payments during the preceding six months, 60% of respondents said they had not missed any payments at all. About 14% of respondents, however, reported more frequent delays, which might be a sign of financial strain or difficulty making payments. Although 11% of households claimed they were unaware of the regulations, the majority (81%) claim they have never been penalised despite these delays, which may be a sign of lax enforcement or a lack of understanding of the penalty mechanisms. Similarly, meter readings are increasingly being submitted online, with 23% using chatbots and 36% using distribution system operator (DSO) websites, whereas manager reporting and phone calls are used less frequently (see Figure 1).

It means that although household interactions with utility providers are increasingly digital, a small but noteworthy percentage of households continue to face the risk of payment delays. This suggests that rather than simple access to payment

technologies, financial constraints and burden perceptions may still have a major influence on payment discipline, even though many households have already adopted successful digital practices.

Figure 1. Payment Discipline Analysis

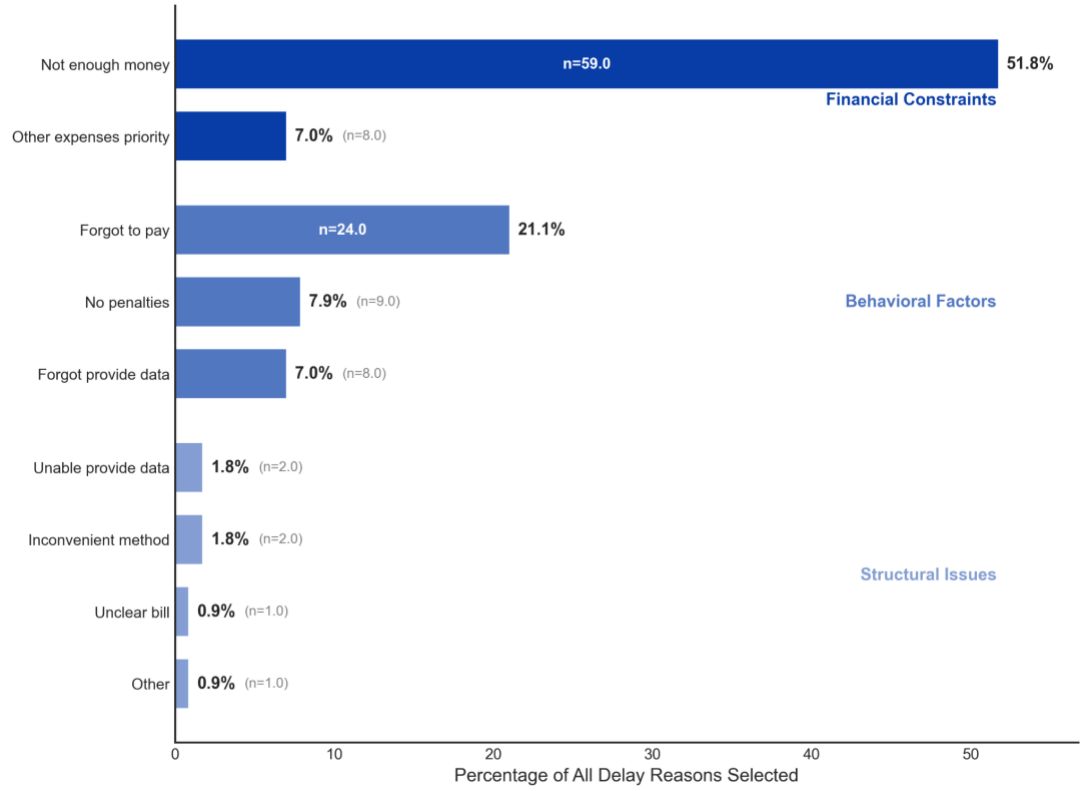


4.2.2 Reasons for Payment Delays

The factors that result in late electricity payments show a combination of behavior and financial considerations. Finance is still a key factor in arrears, as shown by 52% of respondents that reported delayed payment, which was due to a lack of funds at the time of payment. But behavior also takes a toll; about one in five households (21%) simply forgot to pay, while smaller groups reported either forgetting to provide meter data (7%) or delaying paying since there were no penalties (8%). Structural barriers, like challenging data submission (2%) and inconvenient payment methods (2%), were less commonly cited (see Figure 2).

Our findings suggest that in spite of affordability being the primary cause of on-time payment difficulty, behavioral biases like forgetfulness and lax enforcement of penalties are other significant factors contributing as well. For this paper, this indicates that behavioral tendencies and economic adversity should both be considered in an analysis of household sensitivity towards electricity bills.

Figure 2. Reasons for payment delays
(base: 95 people with late payments, 114 total responses)



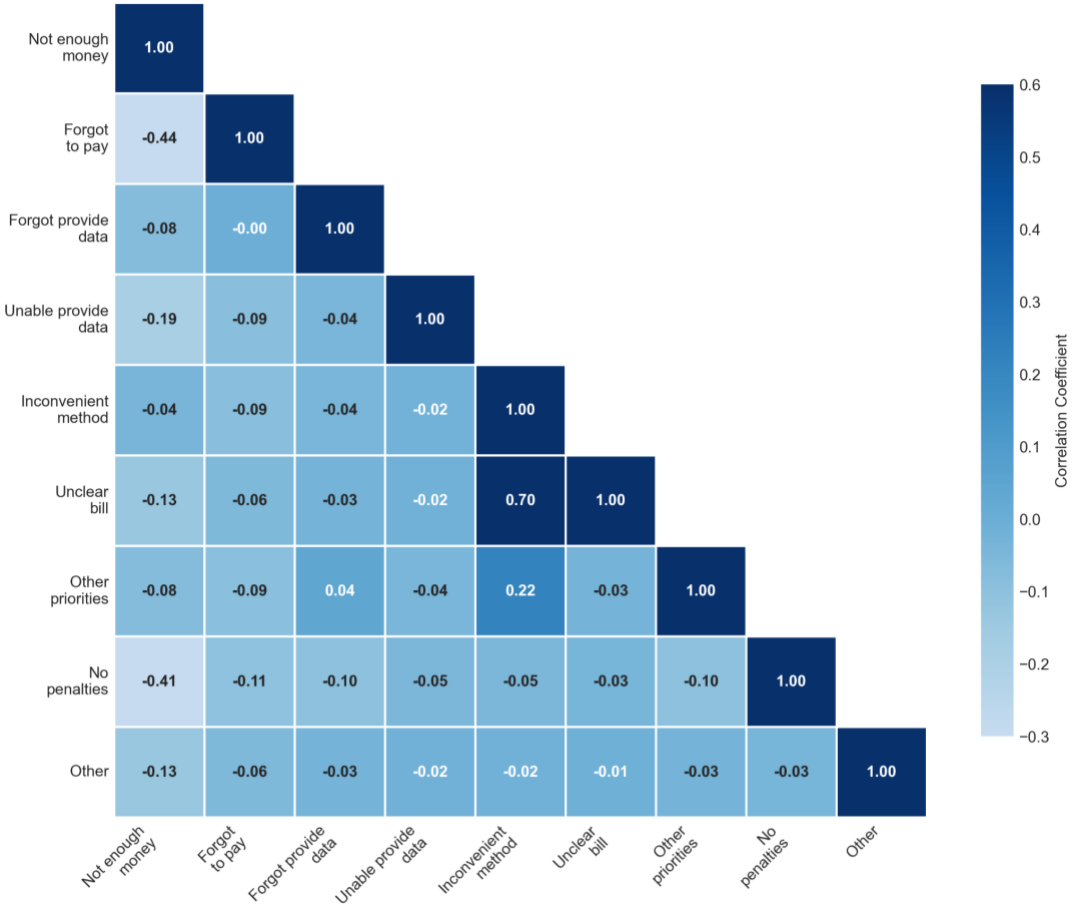
Drivers of late payment are unique and seldom combined—the correlation analysis of reasons to delay payments, however, suggests that those drivers come from a myriad of sources. It has important implications for researchers wishing to examine household behavior. Inconvenient payment methods and unclear bills are the closest things, with a value $r \approx 0.70$ implying that some families have structural problems with the way they pay. Instead of being financially or behaviorally constrained, this group appears to be frustrated with the system functioning.

At the same time, behavioral forgetfulness correlates negatively with financial constraints. Respondents who say they have no money are not going to cite forgetfulness as a reason for delay, and the reverse is likely ($r \approx -0.4$). This tells us that there are two types of people, one who wants to pay but cannot, another who

can pay but finds it challenging to have strict discipline for the payment. Other correlations as forgetting the payment and forgetting to provide data ($r \approx 0.00$) are negligible or nearly 0 and indicate that the causes of the delay are almost always separate from the pattern of the behavior (see Table 6).

Collectively, these results suggest that a one-size-fits-all approach to addressing payment delays will not be effective. Particularly poor households will require specific interventions such as subsidies, flexible payment schedules, or debt relief schemes. In a household with behavioral barriers, reminders, digital automation, or penalty enforcement would work best. Ultimately, those affected by structural issues would benefit from clearer billing practices and simpler payment interfaces. A differentiation among these groups is a key aspect in crafting policies or interventions that could enhance household payment discipline and responsiveness to electricity bills. This distinction between these groups is critical when designing interventions and policies to enhance household payment discipline and responsiveness to electricity bills.

Table 6. Correlation Matrix on payment delay reasons



4.3 Behavioral Economics Indicators

The behavioral economic indicators will explain social and psychological aspects that can govern household payment behavior. These indicators were tested using survey questions on procrastination, social norms, time preferences, and framing effects.

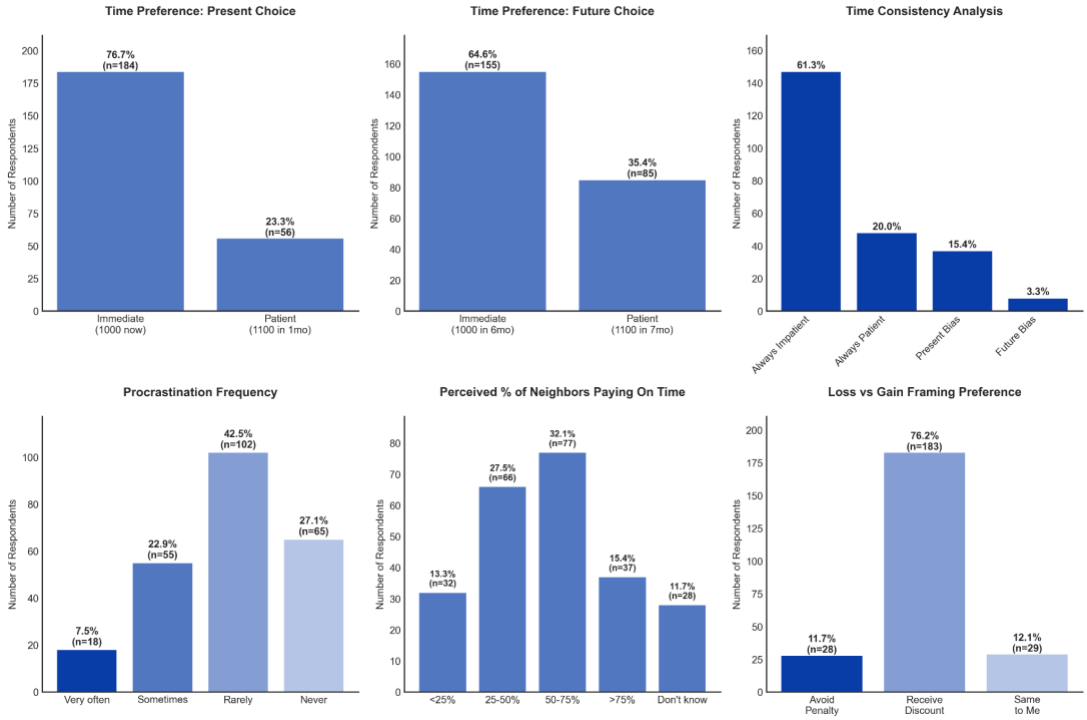
Two choice tasks were applied to measure time preferences: taking 1000 UAH now or 1100 UAH in a month, and taking 1000 UAH in six months or 1100 UAH in seven months. In the present option, only 23.3% used the patient option; the future

choice was 35.4%. This 12.1 percentage point difference indicates present bias, that means households are less patient during decisions when the situation in front of you is immediate. This means household decisions are driven a lot by short-term matters.

A self-survey based on self-report response to the frequency of delaying key activities was employed to measure procrastination. While 27 percent said they never procrastinate, about 30 percent reported doing so occasionally or very frequently. This indicated that large proportions of households are likely to put off payments because of behavioral self-control problems rather than financial hardships. By probing how many of the respondents thought that their neighbors paid on time, social norms were measured. Close to half (47.5%) think that more than half of their neighbors are paying on time, whilst others believe lower compliance (or do not know). This split suggests peer pressure is poor and unequal, limiting the ability of social norms to encourage payment discipline.

The next variable was framing effects, where the interviewer asked respondents whether they are more motivated to buy if getting discounts or avoiding a penalty. Although 76.2% of respondents told us they liked a discount frame, only 11.7% actually liked the penalty frame. This evidence shows that gain-framed incentives are far more effective at inspiring households than loss-framed ones (see Figure 3). So overall, a lot of Ukrainian households procrastinate, discounts are much more powerful than penalties, peer effects are weak and Ukrainian households are impatient with short-term decisions. These tendencies suggest interventions designed to improve payment discipline to be centered around reward-based incentives and reminders, rather than penalties or peer pressure.

Figure 3. Behavioral indicators



The cross-analysis of behavioral indicators and late payment outcomes shows that not all behavioral traits are equally predictive of payment discipline. The late payment rates for impatient respondents (39.7%) and patient respondents (39.3%) are nearly the same, suggesting that time preferences are unrelated. This implies that hypothetical financial decisions made with short-term impatience do not necessarily correspond to real electricity payment patterns.

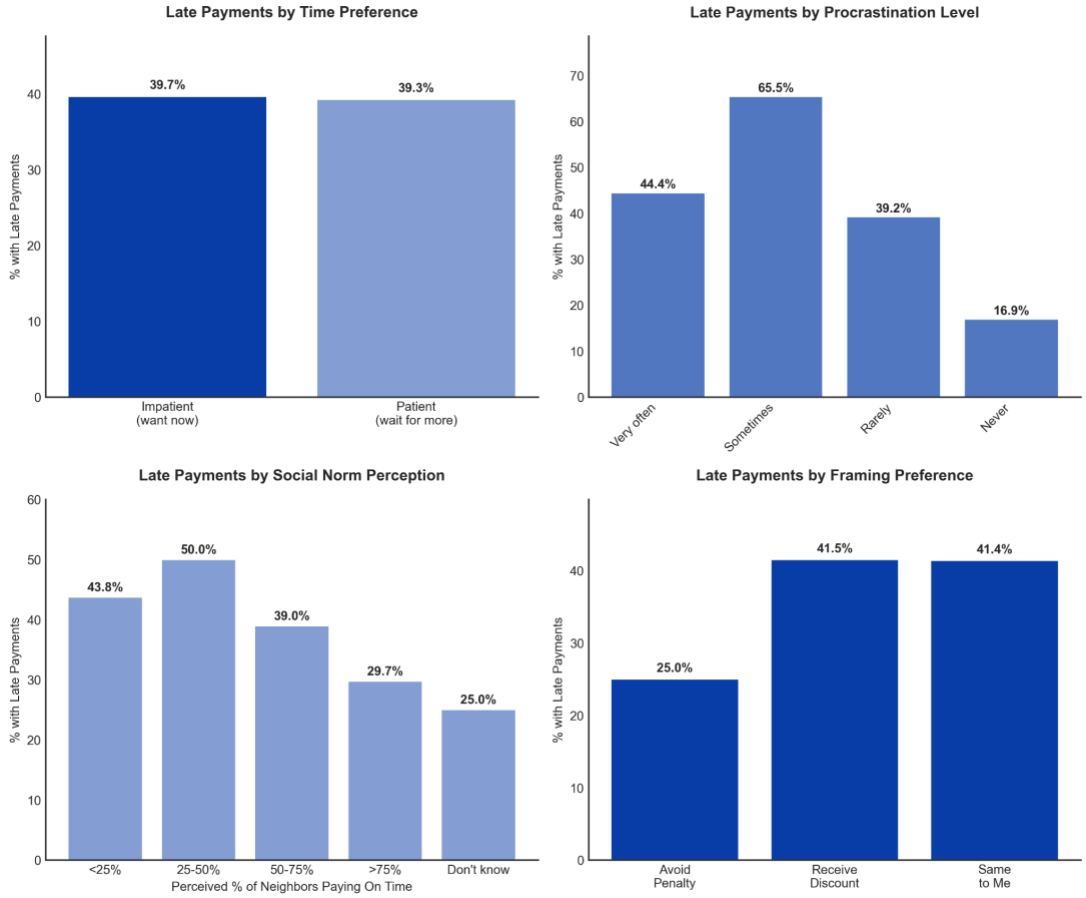
However, there is a strong correlation with procrastination. Just 16.9% of respondents who say they never procrastinate had late payments, compared to 39–44% of those who procrastinate occasionally and 65.5% of those who procrastinate occasionally. Simply spleaking payment discipline and self-control issues are correlated.

Social norms are also important. The proportion of late payments of respondents who believe that the majority of their neighbours pay on time drops from 43.8% to as few as 29.7%, of those who maintain that over 75%. Hence, this suggests that

peer effects of perceived peer behavior can impact individual decisions, even in the payment of utility bills. Framing preferences are less clear. Compared to households driven by discounts (41.5%) or are not interested in framing (41.4%), penalty-motivated households have much lower late payment rates (25%) (see Figure 4). This suggests that although the majority of participants express preference for discounts under hypothetical framing tasks, the loss-averse participants may feel compelled to make better-than-average payments in real life when bill payments are being made.

In other words, social norms and procrastination predict more likely late payment behaviors, while measures of preference toward time appear to be less predictive. Also, in practice, the small group motivated by penalty avoidance has better payment discipline than the rest of the households despite a greater predominance of gain-framed incentives. This emphasizes the need for differentiation of preference statements for behavioral effects of different interventions.

Figure 4. Cross-analysis of behavioral indicators and late payment outcomes



CHAPTER 5. RESULTS

5.1. Late payments predictors

Table 7. OLS regression results: predictor of late payments

Variable	Coefficient (pp)	Robust SE	t-statistic	p-value	95% CI	Sig
Housing: Employer provided (vs Own outright)	+59,375	(9.426)	6,299	<0.0001	[40.90, 77.85]	***
Procrastination frequency ((higher = more))	+14,823	(3.171)	4,674	<0.0001	[8.61, 21.04]	***
Number of children under 18	+10,293	(2.465)	4,176	<0.0001	[5.46, 15.12]	***
Postpone: Only when short on money (vs Frequently)	+38,642	(9.259)	4,174	<0.0001	[20.50, 56.79]	***
Monthly bill category ((higher = more))	+9,892	(3.366)	2,939	0.0033	[3.29, 16.49]	**
Payment: Money transfer to someone (vs Banking mobile app)	-23,785	(8.543)	-2,784	0.0054	[-40.53, -7.04]	**
Postpone: Sometimes (vs Frequently)	+26,739	(10.611)	2,52	0.0117	[5.94, 47.54]	*
Region: East (vs Central)	+27,352	(12.464)	2,194	0.0282	[2.92, 51.78]	*
Model Statistics: N = 234, R^2 = 0.2792, Adj R^2 = 0.2536, F(8, 225) = 25.29, p < 0.001.						
Note: Coefficients in percentage points (pp). Robust standard errors (HC3) in parentheses. *** p<0.001, ** p<0.01, * p<0.05.						

The model explains around 29.5% of the variation in late payments (R^2 = 0.295, Adj. R^2 = 0.270, F(8, 225) = 28.83, p < 0.001). All coefficients are presented in percentage points (pp) with robust standard errors (see Table 7).

The housing situation is one of the strongest indicators of a payment delay. Compared to respondents who fully own their home, those who live in housing provided by their employers are roughly 60 percentage points more likely to have late payments, and those who have a mortgage are roughly 82 percentage points more likely to do so. This may reflect higher financial pressure among households with ongoing housing costs. This is most likely due to financial pressure that these groups of people experience.

On top of that, the model showed that people who transfer payment to someone that pays for electricity are less likely to make a late payment. Usually, this is the case for people who rent the place where they live, and the data proved this hypothesis. Since people do not want to anger their landlord, they tend to pay their bills on time.

The behavioral aspects took a huge role too. It is worth noting that daily routines are positively influencing payment discipline: respondents who reported procrastinating more often had a 15 percentage point lower probability of paying their bills on time. Compared to those who postpone payments regularly even though they have money, those who stated they only do so when they are short on funds or occasionally were 40 and 28 percentage points more likely to do so. This indicates a strong relationship between postponing, whether it is habit or financial strain, and payment behavior, with people who delay only infrequently being at elevated risk of making late payments.

Demographic, also economic factors are important. The probability of a delay at high monthly bill amounts is increased by approximately 11 percentage points, and for children under 18, it's increased by approximately 10 percentage points. Finally, people in the eastern region are 29 percentage points more likely to delay than people in the central region. I suspect it is happening because of the full-scale invasion of Ukraine, because the people who are more in on the front line are so much more affected by it.

The model overall also shows that payment behaviour is determined by behavioural and economic factors. Just as much variation between the two factors can be explained by behavioral tendencies like procrastination and financial postponement in payment decisions as by financial reasons, such as housing or the size of bills. This reinforces the notion that payment discipline is best addressed not just with financial solutions, but behavioral interventions.

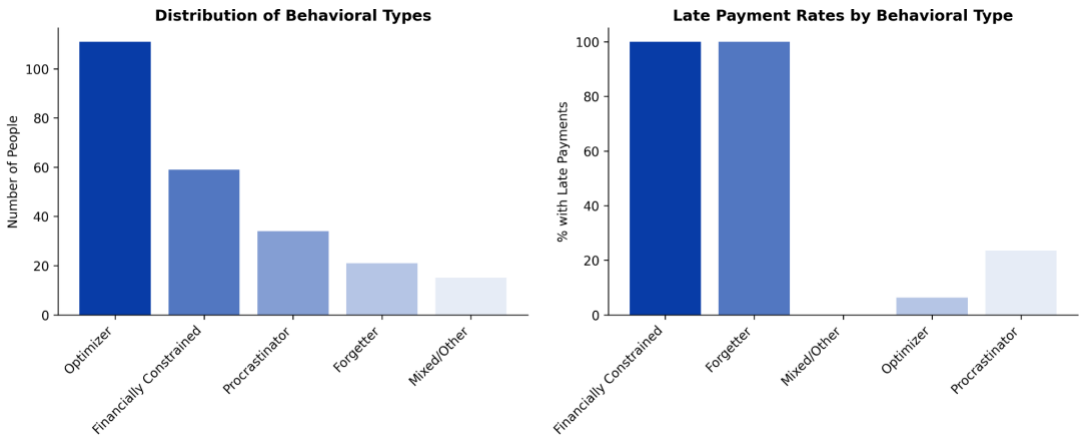
5.2. Behavioral segmentation

Based on the correlation matrix (Appendix B), the behavioral indicators were not highly correlated with one another, indicating that they describe distinct behavioral types. Thus, I categorized respondents into four behavioral types: optimizers; financially constrained; procrastinators; and forgetters. This way, I was able to better identify which types lead to delayed payments, as well as which types are relatively common.

Most individuals were either Financially Constrained or Optimizers, with smaller groups being Procrastinators and Forgetters. Financially Constrained and Forgetters were the most likely to make late payments, indicating that both financial difficulties and forgetfulness are major causes of delays. Optimizers were the least likely to postpone payments, whereas procrastinators were also more likely to do so.

These results confirm the outcomes of the OLS regression, demonstrating that procrastination and a feeling of having too many bills to pay are strong predictors of late payments. The division explains why people delay payments. Some do so because they can't afford it; others do so for organizational or habitual reasons.

Figure 5. Behavioral types



5.3. Effectiveness of nudges

Kruskal–Wallis test was used to compare self-reported motivation scores across the three message treatments. This non-parametric method was chosen to accommodate the ordinal nature of the Likert scale data (1–10).

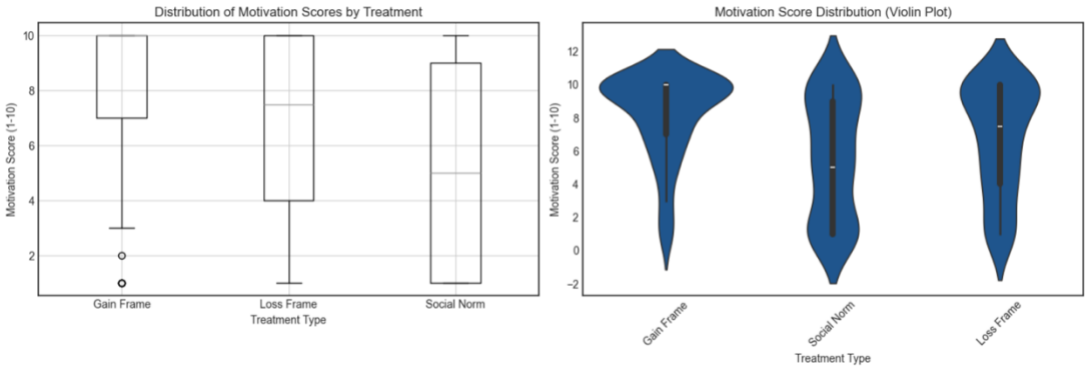
The motivation level of each of the three treatments is presented in Table 8 and can be seen to have remarkable variation. Participants who had received the Gain Frame message (5% discount for timely payment) had the highest motivation score with a median of 10. The message with "Loss Frame" content (a 5% penalty for delay) had a moderate outcome with a median motivation level of 7.5, while the "Social Norm" condition on neighbors (85% have paid) was less effective, with a median of 5.

Table 8. Descriptive statistics of motivation scores by treatment

Treatment	N	Mean	SD	Median	IQR	Min	Max
Social Norm	79	5,58	3,56	5	8	1	10
Loss Frame	76	6,76	3,3	7,5	6	1	10
Gain Frame	85	8,18	2,6	10	3	1	10

Figure 6 illustrates these differences. Responses in the Gain Frame condition were not only higher on average but also more consistent, suggesting a uniformly strong motivational effect. In contrast, the Social Norm treatment exhibited greater variability, indicating heterogeneous reactions among participants.

Figure 6. Mean motivation scores by nudge treatment



Kruskal–Wallis test indicated that the differences were significant ($H = 24.55$, $p < 0.001$). Post-hoc pairwise comparison also showed a significant difference between the Gain Frame and the Loss Frame ($p = 0.004$) and the Social Norm message ($p < 0.001$). No significant difference between the Loss Frame and Social Norm condition was found upon multiple comparison adjustment (Table 10, Appendix B).

These findings suggest that reward-based framing is more successful in causing timely payment of electricity bills than either punishment-based or social comparison related messaging. This results in a particularly strong advantage for the Gain Frame over the Loss Frame, which contradicts the widely held assumption in behavioral economics that loss aversion dictates the process of gain-seeking for consumer behavior.

CHAPTER 6. CONCLUSIONS AND RECOMMENDATIONS

This study investigated the factors that cause Ukrainian households to postpone paying their electricity bills and the messages that can encourage them to do so. The results demonstrate that a combination of behavioral and financial factors contribute to payment delays. Even when they have enough money, some people put off payments due to habit or procrastination, while others who have children, high monthly bills, or mortgages frequently experience financial strain. Therefore, income levels alone cannot account for late payments; daily routines and decision-making styles also play a role.

The behavioral messaging experiment shows that gain-framed messages focusing on the benefit of making an early payment are more effective in promoting individuals' actions. Messages that focused on social comparison or punishment were less successful.

Because of the regulated tariffs and resource constraints of energy suppliers in Ukraine, the financial incentive to pay early will not likely be possible. Utilities, rather than providing direct financial discounts, can use the same principle as incentives via material or symbolic incentives, for example, without even having to pay at the point of sale. They might offer small bonuses, for example. It’s also important to incentivize people who normally pay late. Companies might use a strategy of gradual encouragement a lot like what Monobank does with accomplishments to reward good behavior. For example, electricity providers could offer “milestones” to improve payments like reducing debt or three consecutive on-time payments. Those who meet these targets may be eligible to win monetary prizes or enter a small lottery. Although they allow for the motivation of people who make their payments on time, these gamified tools may guide late payers to adopt better payment practices.

The results also show that different types of consumers need different strategies. For households with limited financial sources, flexible payment plans, installment plans, or short-term support programs that help avoid penalties and disconnection may be more beneficial. Behavioral tools, such as mobile reminders, automated payments, or streamlined billing systems, are better for consumers who are forgetful or procrastinators. Payment discipline can most definitely be improved by identifying and attending to these two primary groups and meeting their needs independently.

Nevertheless, the system must also maintain enforcement mechanisms. If clear rules, predictable late fees, and well-communicated disconnection procedures are in place, fairness and protection for those who regularly pay on time are strengthened. But enforcement alone will not be enough. It will be more effective in practice, in the long run, when combined with behavioral supports.

In summary, financial flexibility along with behavioral innovation is required to establish payment discipline in Ukraine's electricity market. Suppliers can reduce their debt levels while maintaining essential services accessible to all households through nudges, digital tools, and supportive payment structures.

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APPENDIX A
SURVEY

Thank you for taking part in this study.

Please read the following information carefully before proceeding.

This survey is conducted by researchers at the Kyiv School of Economics to better understand how Ukrainian households manage their utility expenses and make decisions about energy services. There are no right or wrong answers.

The survey will take approximately 10-12 minutes to complete.

Eligibility Requirements. To participate, you must:

- Be 18 years or older
- Be responsible (fully or partially) for paying electricity bills in your household
- Have a separate electricity meter/account for your household
- Have lived at your current address for at least 6 months

Important Information:

Your responses are completely anonymous and will be used for research purposes only.

No personally identifiable information will be collected or shared.

Please note that participation is voluntary and that you can leave at any time, but you will only be compensated if you complete the survey in its entirety.

By clicking "Continue," you confirm that you meet the eligibility requirements and consent to participate in this study.

1. What type of housing do you live in?

- Apartment in a multi-story building (5+ floors)
- Apartment in a low-rise building (up to 4 floors)
- Private/detached house
- Part of a house
- Dormitory/communal housing
- Other

2. Who is primarily responsible for paying the electricity bill in your household?

- I am solely responsible
- I share responsibility
- Someone else is responsible → [END SURVEY]
- Does not apply (living in a dormitory etc.) → [END SURVEY]

3. What is your average monthly electricity bill?

- <500 UAH
- 500–1000 UAH
- 1000–2000 UAH
- >2000 UAH

4. What is your gender?

- Male
- Female
- Prefer not to answer

5. How many people currently live in your household (including yourself)?

- Number

6. How many of these are children under 18?

- Number

7. What is your age?:

- 18–24
- 25-34
- 35-44
- 45-54
- 55-64
- 65-74

8. What is your current employment status:

- Full-time employed
- Part-time employed
- Unemployed
- Not working and not looking for work
- Retired
- Student
- Military service
- Prefer not to say

9. What is your household's total monthly income from all sources after taxes (take-home pay)? Please Include all household members' salaries, pensions, subsidies, and regular transfers

- <10,000 UAH
- 10–20,000 UAH
- 20–30,000 UAH
- 30–50,000 UAH
- 50–70,000 UAH
- More than >70,000 UAH

- Prefer not to say

10. Region of residence:

- Vinnytsia
- Volyn
- Dnipropetrovsk
- Donetsk
- Zhytomyr
- Zakarpattia
- Zaporizhzhia
- Ivano-Frankivsk
- Kyiv (region)
- Kirovohrad
- Luhansk
- Lviv
- Mykolaiv
- Odesa
- Poltava
- Rivne
- Sumy
- Ternopil
- Kharkiv
- Kherson
- Khmelnytskyi
- Cherkasy
- Chernivtsi
- Chernihiv

11. What type of settlement do you live in?

- Large city (over 500,000 residents)

- Medium city (100,000–500,000 residents)
- Small city (up to 100,000 residents)
- Urban-type settlement
- Village/rural area

12. What is your housing ownership status?

- Own outright (no mortgage)
- Own with mortgage/loan
- Rent from private owner
- Rent from government/municipality
- Provided by employer
- Live with family/relatives (no rent)
- Other

13. Do you use energy-efficient appliances (LED lamps, A++ appliances, etc.)?

- Yes
- No
- Partially

14. How do you usually submit your electricity meter readings?

- Personal account on the Distribution System Operator's (DSO) website
- Mobile app (e.g., YASNO)
- Chatbot in Viber or Telegram
- By phone via call center
- Through a banking app (e.g., Privat24)
- Through the supplier's Facebook page
- An electrician/building manager submits them instead of me
- Other

15. How do you usually pay your electricity bill?

- Through a banking mobile app (Privat24, Monobank, Oschad24, etc.)
- Through provider's website or mobile application
- In person (bank/post/terminal)
- Automatic payment (direct debit from card or account)
- Money transfer to someone who pays bills instead of me
- Other (your own answer)

16. In the last 6 months, how many electricity bills did you pay after the due date?

- 0 (none)
- 1-2
- 3-4
- 5-6 (all)

17. Main reasons for delaying payment (choose up to 3):

- Not enough money when bill arrived
- Forgot to pay
- Forgot to provide data on electricity consumption
- Was not able to provide data on electricity consumption
- Inconvenient payment method
- Bill amount was unclear/disputed
- Other expenses had priority
- No penalties for delay
- Other (your own answer)

18. What measures would motivate you to pay your bills on time? (multiple answers possible)

- Discount or bonus for timely/early payment
- Prepaid meters (pay in advance, no debt)
- No need to provide electricity consumption data manually

- Flexible payment schedule (possibility to pay in parts during the month)
- Automatic reminders (SMS, in banking app, messenger)
- Debt restructuring programs (installments, partial debt write-off)
- More transparent billing and clear tariff
- Ability to pay together with other utilities (single bill)
- State subsidies
- Other (your own answer)

19. How burdensome are electricity bills for your household budget?

- Not burdensome at all
- Slightly burdensome
- Moderately burdensome
- Very burdensome
- Extremely burdensome

20. Have you ever faced penalties for late payment of electricity bills?

- Yes, repeatedly
- Yes, a few times
- No, never
- I did not know about penalties

21. Would you support prepaid meters if it prevented debt accumulation?

- Yes
- No
- Hard to say

22. Have you ever postponed paying your bill even when you had enough money?

- Yes, frequently (most months)
- Yes, sometimes

- Yes, but rarely
- No, never
- Only delay when short on money

23. Would you prefer to receive:

- 1000 UAH today
- 1100 UAH in 1 month

24. Would you prefer to receive:

- 1000 UAH in 6 months
- 1100 UAH in 7 months

25. How often do you postpone important financial decisions (e.g., paying bills, submitting documents, etc.)?

- Very often
- Sometimes
- Rarely
- Never

26. Which reminder method would help you most?

- SMS 3 days before
- Email with bill attached
- Banking app notification
- Automatic calendar event
- No reminders needed

27. What percentage of people in your area do you think pay their electricity bills on time?

- Less than 25%
- 25-50%
- 50-75%
- More than 75%

- I don't know

28. Which option would you prefer?

- Pay your bill on time and avoid a 5% late penalty
- Pay your bill on time and receive a 5% discount
- These are the same to me

29. How many days typically pass between receiving your main income and your electricity bill due date?

- 0-5 days
- 6-10 days
- 11-20 days
- More than 20 days
- I don't know

TREATMENTS

Setup Question

Imagine you just received this SMS reminder about your electricity bill:

Treatment Arms (Randomize between subjects for each message)

Control (Same for All):

"Your electricity payment is due in 5 days."

Treatment Variations (randomize):

Treatment 1: Social Norm

"Your electricity payment is due in 5 days. 85% of households in your area have already paid their bill this month."

Treatment 2: Loss Frame

"Your electricity payment is due in 5 days. You will be charged a 5% penalty if you pay after this date."

Treatment 3: Gain Frame

"Your electricity payment is due in 5 days. You will receive a 5% discount if you pay before this date."

On a scale from 1 to 10, how much would this message motivate you to pay your bill on time?

1 = Would not motivate me at all 10 = Would strongly motivate me to pay on time

APPENDIX B
ADDITIONAL TABLES

Table 9. Behavioral indicator correlation matrix

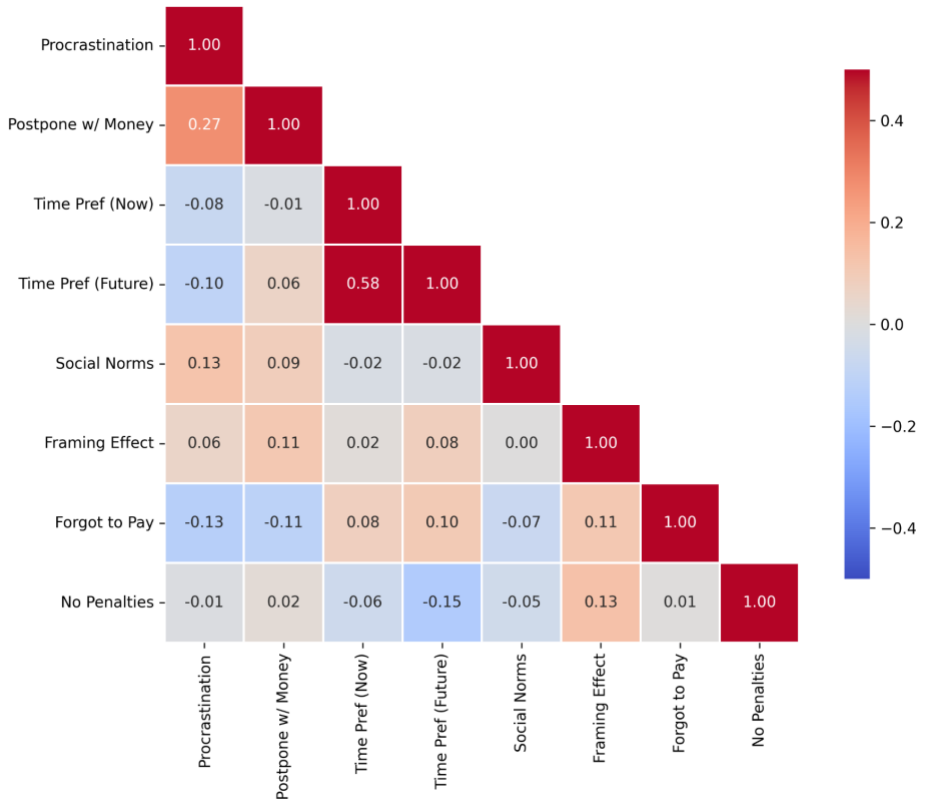

Table 10. Pairwise comparison results

Comparison	U-statistic	p-value	Significant*
Social Norm vs. Loss Frame	2433,5	0.038	No
Social Norm vs. Gain Frame	1921	<0.001	Yes
Loss Frame vs. Gain Frame	2421,5	0.004	Yes

*Bonferroni-adjusted significance level $\alpha = 0.0167$