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The Role of Betting on Digital Credit Repayment, Coping Mechanisms and Welfare Outcomes: Evidence from Kenya

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Abstract: Digital financial services and more importantly, mobile money, have become an important financial innovation to advance financial inclusion in developing and emerging economies. While digital financial services have improved the lives of many Kenyans, to the growing betting segment of the Kenyan population, these innovations have also brought great convenience to betting. The innovations have allowed easy access to digital credit which can be used for betting. Despite betting or gambling being a widely studied area, particularly in developed countries, little is known about its interaction with financial innovations such as digital financial services in developing and emerging economies. Using data from a 2017 digital credit survey in Kenya, this study investigates if bettors are more likely than non-bettors to be financially distressed or engage in welfare-undermining coping strategies and potentially experience inferior welfare outcomes. The study uses a representative sample of 1040 digital borrowers, of which 304 were digital bettors. Using multivariate logistic regressions, the study found that, after controlling for socio-economic and demographic factors, bettors are significantly more likely than non-bettors to be financially distressed, engage in welfare undermining coping strategies, and have inferior welfare outcomes.

Keywords: digital financial services; digital credit; betting; financial distress; coping strategies; welfare outcomes

JEL Classification: D60; E42; E51; G23; G29; O12; O33

1. Introduction

Digital financial services, and more importantly mobile money, have become an important financial innovation to advance financial inclusion in developing and emerging economies. The advent of digital financial services has provided those who are marginalized, traditionally financially excluded, and occupying the lower rungs of a socio-economic status ladder, with an opportunity to partake in the formal financial system. Increased financial inclusion has become possible due to deliberate policy interventions, the growing availability of mobile phones (including smartphones), and internet connectivity in developing and emerging economies (Chamboko et al. 2018). Individuals can remotely access financial services through their phones and hence enjoy improved convenience, improved accessibility, and reduced costs of using financial services (Chamboko et al. 2020).

A growing body of literature also reports a positive and significant impact of digital financial services on household welfare outcomes. Digital financial services facilitate a stable path of consumption amidst financial and income shocks (Suri and Jack 2016) and increase per capita consumption levels, thereby reducing poverty levels in the long run (Munyegera and Matsumoto 2016; Suri and Jack 2016). Wieser et al. (2019) show that digital financial services increase the likelihood of poor rural households to send and receive peer-to-peer cash transfers, reduce the cost of remittances, reduce food insecurity,

and increase non-farm self-employment. Msulwa et al. (2020) also show that access to formal financial services such as savings, credit, and insurance has a positive and significant impact on consumers' asset holding.

In the Kenyan financial market, the availability of financial services through mobile money services is widely celebrated as it has led to the growth of financial inclusion from 26.7% (2006) to 82.9% (2019) (Central Bank of Kenya et al. 2019). With increased access to digital credit in Kenya, consumers can conveniently access loans on their digital platforms, particularly mobile phones, and can use the same channels to make payments and store value. About thirty-four percent of the mobile-phone-owning Kenyan adult population (77% of the adult population) had once taken a loan through a mobile phone (Gubbins and Totolo 2018). Importantly, the number of digital loans has surpassed that of traditional loans at a ratio of about 10:1 by 2018 (MicroSave Consulting 2019).

While digital financial services have improved the lives of Kenyans, the rise in digital credit provisioning has nonetheless facilitated access to cash that can be used for betting. Gambling in Kenya takes on various forms, including sports betting (e.g., SportPesa, Betin, and Betway), casinos, pool games, bingo, phone-in-talk shows, scratch cards, and lotteries. The most common are sports betting, where bettors wager money on an outcome of an uncertain sports event with the hope of winning more money (Prasad and Jiriwal 2019; Williams et al. 2017). King et al. (2014); Gainsbury et al. (2013) and Gainsbury et al. (2012) pointed out that increased access to mobile devices (smartphones and tablets) has made some gambling activities an "anytime, anywhere" activity. A GeoPoll survey shows a startling prevalence of betting in Kenya, estimating that about 57% of the adult population (above 16 years) have participated in betting in the past, with a high prevalence among smartphone owners (Roxana 2019). Kisambe (2017) reports that Kenya (76%) leads in Sub-Saharan Africa in terms of youth gamblers, and among these youth gamblers, 96% use their mobile phones. The Kenyan FinAccess Household Survey of 2019 reports a conservative 1.9% prevalence of self-reported betting activities among mobile money users in Kenya. It is however important to highlight that the FinAccess survey could be understating the betting level in Kenya since it is an adult survey, which does not report underage bettors. In addition, the 2019 FinAccess Household Survey shows that among those who indulge in betting, 22.6% bet daily, 51.7% bet weekly, 6.9% bet monthly, and 17.1% bet intermittently, especially when there are big prizes to be won. Furthermore, close to 20% of the Kenyan adult population holds the opinion that betting is a good source of income (Central Bank of Kenya et al. 2019), and Schmidt (2020) reports that many Kenyans see gambling as a legitimate activity to earn a living in an economy unresponsive to their employment demands.

The Kenyan government recognizes the potential danger that is posed by gambling in an inadequately regulated environment. The growing prevalence of betting and more so the frequency of betting among bettors can potentially have harmful effects. The government of Kenya has recently raised taxes for betting, lottery, and gaming and for companies running prize competitions from around 10% to 20%, but this has faced resistance, resulting in some of the major companies in this business closing their operations in Kenya. Continued pressure on the government resulted in outright cancellation of the tax as gazetted and signed in the 2020 Finance Bill (iGaming Business 2020).

Despite gambling in general being a widely studied area, particularly in developed countries, little is known about betting, an activity gamblers engage in, and its interaction with financial innovations such as digital financial services, especially in developing and emerging economies. This study thus contributes to the literature by exploring the role of betting on digital credit repayment, coping mechanisms, and welfare outcomes in Kenya (a digitized African society). We first investigate if bettors are more likely to be financially distressed as illustrated by late repayments, having multiple loans due, failing to make all payments, and receiving reminders to repay loans. Secondly, we evaluate the possibility of bettors engaging in welfare-undermining coping strategies such as the selling of assets and borrowing to repay loans. Finally, we investigate the potential impact of betting on food and medical uptake by bettors. As far as our search is concerned, this is the first

peer-reviewed paper to study the relationships between digital financial services, betting, and welfare outcomes in the form of foregoing food and medical uptake in a developing country setting.

The rest of the paper is structured as follows. Section 2 provides brief literature on gambling and new financial technology. Section 3 discusses the data and measurements and methods employed in this paper, whilst Section 4 presents results and discusses the findings of the study. Section 5 concludes.

2. Gambling and New Financial Technology

Two important theories are key in explaining gambling, i.e., the theory of planned behavior (Ajzen 2011; McEachan et al. 2011) and the habitual behavior theory (Van Rooij et al. 2017). The intention to engage in a behavior (gambling) depends on beliefs about and attitudes towards the behavior, perceived social and subjective norms surrounding the behavior, and the extent to which people perceive to have behavioral control over their own behavior (Van Rooij et al. 2017). With new financial technology that is accessible with any mobile phone, behavioral intentions and actual behavior in gambling are brought close to each other. Moreover, Van Rooij et al. (2017) argue that with online gambling, the thresholds for digitally accessing content are very low and costs of initiation quite low, so the role of habitual behavior hypothetically becomes larger.

As the literature suggests, gambling has undesirable and unavoidable effects. It is addictive and becomes compulsive. Compulsiveness is explained by both the strength model (Baumeister et al. 2007) and the process model (Inzlicht et al. 2014), leading to impulsive choices being pursued. In Kenya, the absence of regulations that, for instance, allow gamblers to impose time limits, spending limits, and placing themselves in exclusion limits paves the way for this compulsiveness. Gambling is also associated with a greater degree of delay discounting i.e., growing impatience, especially as the gambling habit becomes strong (Orford 2011). Self-control and exercise of willpower are overridden. In fact, the capacity to favor abstract and distal goals when they are threatened by competing concrete and proximal goals (Baumeister et al. 2007; Fujita 2011) diminishes in compulsive gambling. Gambling effects are substantial in digital gambling because the breadth involvement and depth involvement (LaPlante et al. 2014) are quite high due to the accessibility of the addictive object. In other words, the gambler has access to gambling opportunities on the device readily available, allowing for between-session and within-session chasing of gambling (Nigro et al. 2019; Sacco et al. 2011).

Brevers et al. (2018) discuss satisfaction derived by gamblers from online gambling, now with new financial technology as ready-to-consume rewards redefining humans' self-control abilities. However, rewards from gambling are very unlikely, such that Jerome Cardano (1525) wrote " . . . The greatest advantage of gambling comes from not playing at all. There are so many difficulties and so many possibilities of loss that there is nothing better than not to play at all" (cited in Orford 2011, p. 50). Clinical case studies across the world, surveys of Gamblers Anonymous members, and in-depth interview studies suggest "indebtedness, stealing, deceiving and lying, arguments, violence and the breakdown of relationships, as well as personal depression and suicidal feelings" (Orford 2011) as some of the effects of gambling. Håkansson and Widinghoff (2020) find that over-indebtedness is associated with combined online casino gambling and sports betting, expected over-indebtedness is associated with online gambling, and problem gambling is associated with a history of having borrowed money for gambling. Problem gambling also leads to psychological distress via a direct pathway, i.e., problem gambling is included as a predictor in the model, and via an indirect pathway, i.e., debts accumulated as a result of problem gambling drive psychological distress (Oksanen et al. 2018). Thus, the spread of digital gambling in Kenya, a developing economy with a youthful and mostly unemployed population and a non-banking adult population in need of financial inclusion, is an issue that requires policy intervention. Hence this paper's aim to explore the potential role of betting on financial distress, coping strategies, and the welfare of bettors.

3. Data and Methods

This study employs data from a Kenyan nationally representative digital credit survey conducted in 2017. The sample constitutes 3130 participants among Kenyan mobile phone users. The data are the property of the Central Bank of Kenya, Kenya National Bureau of Statistics, and Financial Sector Deepening Kenya, and the authors obtained permission to use the data for this study. Since the survey was conducted telephonically, the sample was drawn from mobile phone users in Kenya and was weighted to be representative of mobile phone owners in the country. Given that one can only use digital credit when one has access to a mobile phone, the subsample that reported to have used digital credit can be considered as representative of digital credit borrowers in the country. Out of the total sample (3130), about a third (1040) reported that they are digital credit users, and about 29% (304) of these digital credit users were identified as bettors. The key questions in the instrument that enabled us to assess the likelihood of being financially distressed included whether the participant was ever late in repaying a loan they took from the mobile phone, whether they received an SMS from the lender as a reminder for repayment on an overdue balance, and whether they were ever in a situation when payments were due on multiple loans at the same time and could not make all payments. For the welfare-undermining coping strategies, information on whether participants had to sell assets to pay loans or borrow to repay loans was gathered. Welfare outcomes included going without food or without medicine or medication that was needed.

Descriptive statistics are used in understanding the sample studied and the occurrence of betting and loan repayment behavior. The Chi-square test for association is used to ascertain if there is a relationship between the outcome variables and explanatory variables without controlling for other factors (Chamboko et al. 2017). Univariate logistic regression is used to determine if there is a relationship between the outcome variables and the individual explanatory variables. Further, multivariate logistic regression is used to check for an association between betting and the outcomes variables (proxy measures of financial distress, undesirable coping strategies, and welfare outcomes), controlling for education, age, gender, locality, and income. For the multivariate analysis component, the following specifications are implemented using the binary logistic regressions:

$$LatePayment_i = \beta_0 + \beta_1 Bettor_i + \beta_2 Agegroup_i + \beta_3 Gender_i + \beta_4 Education_i \\ + \beta_5 Locality_i + \beta_6 Incomegroup_i + \varepsilon_i$$

$$ReceivedSMS_i = \beta_0 + \beta_1 Bettor_i + \beta_2 Agegroup_i + \beta_3 Gender_i + \beta_4 Education_i \\ + \beta_5 Locality_i + \beta_6 Incomegroup_i + \varepsilon_i$$

$$MultipleLoans_i = \beta_0 + \beta_1 Bettor_i + \beta_2 Agegroup_i + \beta_3 Gender_i + \beta_4 Education_i \\ + \beta_5 Locality_i + \beta_6 Incomegroup_i + \varepsilon_i$$

$$SoldAssets_i = \beta_0 + \beta_1 Bettor_i + \beta_2 Agegroup_i + \beta_3 Gender_i + \beta_4 Education_i \\ + \beta_5 Locality_i + \beta_6 Incomegroup_i + \varepsilon_i$$

$$BorrowToPay_i = \beta_0 + \beta_1 Bettor_i + \beta_2 Agegroup_i + \beta_3 Gender_i + \beta_4 Education_i \\ + \beta_5 Locality_i + \beta_6 Incomegroup_i + \varepsilon_i$$

$$WithoutFood_i = \beta_0 + \beta_1 Bettor_i + \beta_2 Agegroup_i + \beta_3 Gender_i + \beta_4 Education_i \\ + \beta_5 Locality_i + \beta_6 Incomegroup_i + \varepsilon_i$$

$$WithoutMeds_i = \beta_0 + \beta_1 Bettor_i + \beta_2 Agegroup_i + \beta_3 Gender_i + \beta_4 Education_i \\ + \beta_5 Locality_i + \beta_6 Incomegroup_i + \varepsilon_i$$

where the main explanatory variable *bettor* is a binary (Yes/No) derived from a survey question "Have you tried any of the digital betting services?". A more detailed description of the other covariates in the models is provided in Table 1.

Table 1. Bivariate relationship between betting and socio-demographic variables.

Variable	Sample	Bettor (Yes)	Bettor (No)	Chi-Square	*p*-Value
Gender	n = 1040				
Male	55%	39.43	60.57	46.0114	0.000
Female	45%	20.25	79.75		
Locality	n = 1040				
Urban	49%	29.62	70.38	0.9895	0.320
Rural	51%	26.70	73.30		
Education	n = 1040				
None-primary	28%	27.56	72.44		
Secondary	46%	18.57	81.43	47.4835	0.000
Tertiary	26%	44.53	55.47		
Age group	n = 1040				
16–25	15%	35.81	64.19		
26–35	42%	21.86	78.14		
36–45	27%	39.86	60.14	41.0758	0.000
46–55	10%	13.01	86.99		
56+	6%	23.33	76.67		
Income group	n = 1040				
0–10,000	59%	26.63	73.37		
10,001–20,000	22%	32.06	67.94	6.6618	0.083
20,001–40,000	13%	35.43	64.57		
40,001+	6%	37.14	62.86		

The outcomes variables are derived from the survey questions and are defined as follows:

LatePayment: Have you ever been late in repaying a loan that you took from your phone?
ReceivedSMS: Received SMS from the lender to encourage repayment on your overdue balance?
MultipleLoans: Have you ever been in a situation when payments were due on multiple loans at the same time and you could not make all payments?
SoldAssest: Sold assets or belongings to pay loan?
BorrowToPay: Borrowed to pay loan?
WithoutFood: In the last 12 months, how often have (you) or your family gone without enough food to eat?
WithoutMeds: In the last 12 months, how often have (you) or your family gone without medicine or medical treatment that was needed?

The welfare variables *WithoutFood* and *WithoutMeds* required respondents to indicate the frequency at which they experienced the situations. Four options were provided, and from these, a binary variable indicating whether or not the person experienced the situation was constructed. All responses given as "often; sometimes or rarely" equal 1, and "never" equal 0.

4. Results and Discussion

As shown in Table 1, fifty-five percent of the participants were males, and 51% lived in rural areas. About 28% had primary or no formal education, 46% had secondary education, and 26% had tertiary education. Middle-aged people (26–45 years) dominated the sample (69%), while the remaining 31% was shared almost equally between those under 26 years and those above 45 years of age. In terms of income, more than half (59%) of the sample earned 10,000 shillings or less (1 US $ ≈ 108 Kenyan shillings), 22% earned 10,001–20,000 shillings, 13% earned 20,001–40,000 shillings, and 7% earns 40,000 shillings or more. Table 1 also shows significant variation of betting by participants' gender, education, age, and income group (Chi-square tests). About 39% of males and 20% of females were bettors. Almost half of those with tertiary education, about a fifth of those with

secondary school, and almost a third of those with primary or no formal education were bettors, a pattern that suggests that betting is common among educated adults. Except for those in the age range of 46–55 years, for all other age categories, more than a fifth of the participants were bettors, and more than a quarter of each income group reported betting. Schmidt (2019, 2020) emphasized that gambling in Kenya is viewed as a legitimate and transparent way of earning a living and is motivated by limited employment and income-earning opportunities, but it is also viewed as a future-income-earning opportunity, especially among the affluent. These are all possible explanations why betting is high among the educated, as well as young and middle-aged adults, and cuts across all income groups.

The bivariate relationships between betting and financial distress, as well as undesirable coping strategies and selected welfare outcomes, are presented in Table 2. The prevalence of having multiple payments due at the same time and not being able to make all payments was 20%, that of receiving an SMS as a reminder for delayed due payment is 53%, and that of being late in repaying digital loans was 48%. In terms of undesirable coping mechanisms, the prevalence of borrowing to pay an existing loan was 16%, while that of selling assets/belongings to be able to repay the loan was 5%. With respect to welfare outcomes, the prevalence of having gone without food at some stage is 29%, while that of going without required medicine is 22%. Chi-square tests were employed to check on the associations of these covariates and outcomes. Bettors (57%) were significantly more likely to receive an SMS for their digital credit repayment from a lender to encourage repayment on overdue balance than non-bettors (51%) ($p = 0.065$). Bettors (54%) were also more likely than non-bettors (45%) to be late in repaying a loan taken through their phones, and this relationship is statistically significant ($p = 0.007$). The results also reveal that bettors (25%) were significantly more likely than non-bettors (17%) to have payments that were due on multiple loans at the same time and to be unable to make all payments ($p = 0.004$).

Regarding betting and coping mechanisms, the results show that bettors (8%) were more likely to sell assets or belongings to pay loans compared to non-bettors (4%), and this relationship is statistically significant ($p = 0.015$). However, bettors (18%) and non-bettors (15%) did not show any differences in terms of borrowing to repay loans ($p = 0.211$). The bivariate analysis between betting and selected welfare outcomes did not show any significance, although the percentages for going without food (30.9% vs. 29.6%) and without needed medicine or medication (23% vs. 21%) were higher for bettors compared to non-bettors.

Table 3 presents the univariate and multivariate association between betting and *digital credit repayment* outcomes. The results of interest are those from the multivariate regressions. After controlling for income, age, gender, location (rural/urban), and level of education, the results show that bettors were almost twice more likely than non-bettors to have payments due on multiple loans at the same time and could not make all payments, and this relationship was significant (odds ratio (OR) = 1.84, $p = 0.002$). Similarly, bettors were almost one and half times more likely than non-betters to receive an SMS from a lender encouraging repayment on the overdue balance, and this association is statistically significant (OR = 1.4, $p = 0.043$). Bettors were also one and a third significantly more likely than non-bettors to be late in repaying a digital loan (OR = 1.33, $p = 0.072$).

As is reported in Table 4, after controlling for income, age, gender, locality (rural/urban), and level of education, being a bettor is significantly associated with selling assets or belongings in order to pay loans. In fact, bettors are more than twice as likely as non-bettors to do so (OR = 2.39, $p = 0.012$).

When "being a bettor" is the explanatory variable for a binary logistic regression model and "going without food" is an outcome, and income, age, gender, locality (rural/urban), and level of education (Table 5) are controlled for, bettors are one and half times more likely than non-bettors to have gone without food at some point in the past 12 months, and this association is significant (OR = 1.56, $p = 0.017$). However, going without medication has no significant association with being a bettor.

Table 2. Bivariate relationship between betting and digital credit repayment/coping strategies/welfare outcomes.

	Factor	Ever Been Late in Repaying a Loan Taken from Phone (%)		Received SMS to Encourage Repayment on Overdue Balance (%)		Payments Due on Multiple Loans at the Same Time and Could Not Make All Payments (%)		Borrowed to Pay Loan (%)		Sold Assets or Belongings to Pay Loan (%)		Gone without Enough Food to Eat (%)		Gone without Medicine or Medical Treatment that Was Needed (%)		All
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	All
Bettor (%)	Yes	54.28	45.72	57.24	42.76	25.00	75.00	17.76	82.24	7.57	92.43	30.92	69.08	23.03	76.97	29%
	No	45.11	54.89	50.95	49.05	17.26	82.74	14.67	85.33	3.94	96.06	29.62	70.38	20.52	79.48	71%
	Total	48%		53%		20%		16%		5%		29%		22%		
	Chi-Square	7.2467		3.4107		8.2140		1.5613		5.9536		0.1735		0.8100		
	p-value	0.007		0.065		0.004		0.211		0.015		0.677		0.368		
Sample (n)		1040		1040		1040		1040		1040		1040		1040		1040

Table 3. Association between betting and digital credit repayment.

Factors	Ever Been in a Situation When Payments Were Due on Multiple Loans at the Same Time and You Could Not Make All Payments (Yes/No)				Received SMS from the Lender to Encourage Repayment on Overdue Balance (Yes/No)				Ever Been Late in Repaying a Loan That You Took from Your Phone (Yes/No)			
	Univariate		Multivariate		Univariate		Multivariate		Univariate		Multivariate	
	Coefficient	SE	Coefficient	OR (SE)	Coefficient	SE	Coefficient	OR (SE)	Coefficient	SE	Coefficient	OR (SE)
Bettor	0.469 ***	0.164	0.610 ***	1.840 (0.356)	0.253 *	0.137	0.337 **	1.401 (0.233)	0.368 ***	0.137	0.296 *	1.344 (0.221)
Education (base outcome: primary or no formal education)												
Secondary	0.144	0.210	−0.030	0.970 (0.246)	−0.126	0.169	−0.090	0.913 (0.193)	−0.090	0.168	−0.034	0.966 (0.203)
Tertiary	0.004	0.197	−0.078	0.924 (0.209)	−0.225	0.155	−0.189	0.827 (0.155)	−0.120	0.154	−0.054	0.947 (0.177)
Urban	−0.028	0.164	0.013	1.013 (0.179)	0.034	0.131	0.016	1.016 (0.147)	−0.042	0.131	−0.079	0.923 (0.133)
Female	−0.072	0.156	−0.073	0.929 (0.169)	0.017	0.125	0.130	1.138 (0.169)	−0.159	0.124	−0.153	0.857 (0.127)
Age (base outcome: 55+ years)												
16–24	0.705	0.519	0.545	1.725 (0.938)	0.340	0.313	0.328	1.389 (0.487)	0.548 *	0.327	0.383	1.467 (0.535)
25–34	0.982 *	0.483	0.813	2.255 (1.120)	0.718 **	0.283	0.739 **	2.094 (0.657)	1.034 ***	0.297	0.879	2.409 (0.787)
35–44	1.206 *	0.488	1.215 ***	3.372 (1.684)	0.597 **	0.291	0.597 *	1.818 (0.582)	0.609 **	0.306	0.533	1.704 (0.569)
45–54	1.081 *	0.517	1.234 ***	3.435 (1.824)	0.688 **	0.321	0.637 *	1.89 (0.671)	0.733 **	0.334	0.591	1.805 (0.663)
Inc in 000 (base outcome: 40+ shillings)												
≤10	−0.197	0.309	0.001	1.001 (0.367)	−0.154	0.253	−0.112	0.893 (0.268)	−0.191	0.252	−0.015	0.984 (0.292)
10 < Inc ≤ 20	0.168	0.333	0.147	1.158 (0.427)	−0.047	0.278	−0.209	0.811 (0.254)	−0.451	0.277	−0.340	0.711 (0.221)
20 < Inc ≤ 40	−0.319	0.377	−0.288	0.749 (0.302)	−0.119	0.299	−0.278	0.756 (0.251)	−0.441	0.299	−0.313	0.730 (0.241)
constant	-		−2.347 ***	0.095 (0.056)	-		−0.289	0.748 (0.310)	-		−0.578	0.560 (0.236)
Pseudo R2	-		0.0249		-		0.0135		-		0.0197	
Sample (n)	1040		1040		1040				1040			

Notes: Inc = income group; level of significance: $p < 0.01$ ***, $p < 0.05$ **, $p < 0.10$ *.

Table 4. Association between betting and coping mechanism.

Factors	Sold Assets or Belongings to Pay Loan				Borrowed to Repay a Loan			
	Univariate		Multivariate		Univariate		Multivariate	
	Coefficient	SE	Coefficient	OR (SE)	Coefficient	SE	Coefficient	OR (SE)
Bettor	0.691 **	0.288	0.869 **	2.386 (0.825)	0.228	0.183	0.063	1.066 (0.231)
Education (base outcome: primary or no formal education)								
Secondary	0.303	0.396	0.777	2.175 (1.077)	−0.498 **	0.222	−0.517	0.595 (0.159)
Tertiary	0.222	0.373	0.356	1.428 (0.640)	−0.544 ***	0.202	−0.661	0.516 (0.123)
Urban	0.868 ***	0.309	1.181	3.260 (1.088)	0.168	0.181	0.149	1.161 (0.223)
Female	−0.543 *	0.289	−0.420	0.656 (0.218)	−0.063	0.172	−0.047	0.954 (0.190)
Age (base outcome: 55+ years)								
16−24	0.505	0.806	0.697	2.009 (1.676)	0.229	0.440	0.087	1.091 (0.533)
25−34	0.447	0.752	0.483	1.622 (1.264)	0.333	0.401	0.236	1.266 (0.553)
35−44	−0.033	0.795	−0.126	0.880 (0.733)	−0.006	0.418	0.012	1.013 (0.457)
45–54	1.047	0.786	1.512	4.538 (3.713)	0.042	0.461	−0.025	0.975 (0.491)
Inc in 000 (base outcome: 40+ shillings)								
≤10	0.686	0.738	0.685	1.984 (1.573)	0.486	0.413	0.844	2.327 (1.091)
10 < Inc ≤ 20	0.636	0.781	0.292	1.340 (1.099)	0.594	0.439	0.593	1.810 (0.877)
20 < Inc ≤ 40	0.101	0.879	−0.238	0.787 (0.716)	0.688	0.460	0.634	1.885 (0.943)
constant	-		−4.994 ***	0.006 (0.007)	-		−2.054 ***	0.128 (0.078)
Pseudo R2	-		0.0765		-		0.0132	
Sample (n)	1040		1040				1040	

Notes: Inc = income group; level of significance: $p < 0.01$ ***, $p < 0.05$ **, $p < 0.10$ *.

Table 5. Association between betting and welfare outcomes.

Factors	Gone without Enough Food to Eat				Gone without Medicine or Medical Treatment that Was Needed			
	Univariate		Multivariate		Univariate		Multivariate	
	Coefficient	SE	Coefficient	OR (SE)	Coefficient	SE	Coefficient	OR (SE)
Bettor	0.061	0.148	0.443 **	1.558 (0.290)	0.148	0.164	0.307	1.359 (0.276)
Education (base outcome: primary or no formal education)								
Secondary	0.918 ***	0.197	0.322	1.380 (0.339)	0.722	0.212	0.030	1.031 (0.269)
Tertiary	0.697 ***	0.186	0.233	1.263 (0.286)	0.344	0.205	0.030	0.767 (0.188)
Urban	0.208	0.141	0.450 ***	1.569 (0.257)	−0.018	0.157	0.204	1.227 (0.220)
Female	0.335	0.137	0.218	1.244 (0.210)	0.291	0.154	0.052	1.053 (0.195)
Age (base outcome: 55+ years)								
16−24	−0.487	0.319	−0.625	0.534 (0.205)	−0.325	0.342	−0.568	0.566 (0.228)
25−34	−0.555 *	0.285	−0.459	0.631 (0.213)	−0.692 *	0.309	−0.634	0.530 (0.189)
35−44	−0.304	0.293	−0.225	0.798 (0.276)	−0.469	0.318	−0.561	0.570 (0.209)
45–54	−0.557 *	0.332	−0.343	0.709 (0.276)	−0.156	0.348	−0.233	0.792 (0.321)
Inc in 000 (base outcome: 40+ shillings)								
≤10	2.387	0.521	2.551 ***	12.82 (3.847)	2.173 **	0.597	2.555 ***	12.880 (3.510)
10 < Inc ≤ 20	1.423	0.543	1.556 **	4.743 (2.963)	1.280 ***	0.623	1.586 **	4.887 (2.682)
20 < Inc ≤ 40	0.715	0.588	0.894	2.445 (1.622)	0.646	0.676	1.004	2.730 (2.172)
constant	-		−3.162	0.042 (0.029)	-		−2.978	0.050 (0.040)
Pseudo R2	-		0.0849		-		0.0689	
Sample (n)	1040						1040	

Notes: Inc = income group; level of significance: $p < 0.01$ ***, $p < 0.05$ **, $p < 0.10$ *.

The risks associated with gambling in general are well-known, and Effertz et al. (2018) posit that the discussion about the gambling risks is as old as gambling itself. Research on online gambling is relatively recent, however, and Papineau et al. (2018) put the time frame of research focusing on online gambling and public health concerns as having started about twenty years ago, with the advancement in technology facilitating online gambling. In the current study, digital financial services, facilitated by accessibility of advanced technology-savvy gadgets such as smartphones and tablets, allow for ease of access to gaming and online applications for gambling. Effertz et al. (2018) argue that gaming and online applications for gambling are faster, more attractive, and less costly, yet they are more addictive when compared to traditional gambling opportunities. Zhang et al. (2018) find that mobile phones, especially smartphones, are the most commonly used platforms for online gambling among Asian individuals. Black et al. (2017) and Papineau et al. (2018) report gambling problems to have more adverse effects among online gamblers compared to offline gamblers. The current study reports such negative effects of digital betting on credit repayment, coping mechanisms, and welfare outcomes in a digitized developing economy.

The self-reported financial distress measures show that bettors have a higher likelihood of becoming financially distressed when compared to non-bettors. Mihaylova et al. (2013) and Håkansson and Widinghoff (2020) also report that online gambling is associated with problem gambling, overspending, and over-indebtedness. Online gambling as a behavioral addiction (Mallorquí-Bagué et al. 2017) is in our study found to be associated with negative outcomes. Participants in our study embraced financial innovations that are accessible via mobile phones and tablets, thus making finances accessible through digital means and at the same time have the opportunity to gamble. This puts them in a position to easily engage in online or digital gambling.

The current study also indicates that betting is associated with undesirable coping mechanisms as shown by the tendency to use assets or other belongings to repay loans among bettors. These undesirable coping mechanisms are exemplary of what Black et al. (2017) and Papineau et al. (2018) consider as extra burden impacts of online gambling on the lives of gamblers. Together, the association between betting and being financially distressed and engaging in undesirable coping mechanisms, as well as the risk of going without food among bettors, suggest an impaired quality of life among bettors. A study by Papineau et al. (2018) shows that online gambling impacts gamblers' work, relationships, mental and physical health, finances, and quality of life. Although financial innovations such as digital financial services improve peoples' lives, for the betting segment of the population, the negative effects of betting pose a considerable threat given that it enables problem gambling, Black et al. (2013) and other earlier researchers argue to be a public health problem that is costly to the society.

5. Conclusions

Digital financial services and, more importantly, mobile money, have become an important financial innovation to advance financial inclusion in developing and emerging economies. A growing body of literature also reports a positive and significant impact of digital financial services on household welfare outcomes. Nevertheless, to the growing betting segment of the Kenyan population, digital financial services have brought great convenience to betting by allowing easy access to digital credit that can be used for betting. Using survey data from Kenya, this study shows that digital betting is associated with undesirable outcomes on credit repayment, coping mechanisms, and the welfare of bettors. When controlling for socio-economic and demographic factors, bettors were shown to be more likely than non-bettors to be financially distressed, engage in welfare undermining coping strategies, and have inferior welfare outcomes. These findings suggest the need for educating the public about the possible effects of betting and gambling in general.

This study has some limitations. First, it only shows associations between betting and identified outcomes, and it does not infer causal relationships. As such, studies that can isolate the effects of betting on these outcomes using careful identification strategies are

needed. The second limitation in the data is that there is no specific survey question that captures the amount of the wagers. For example, a 100 shillings wager every day, though higher in frequency, is less significant than a 2000 shillings wager three times a week. In addition, no information was gathered with respect to an increase in the amount of a wager over time. These data limitations can be addressed by developing a specific questionnaire that gathers detailed information with regard to gambling and welfare outcomes in Kenya.

References

Ajzen, Icek. 2011. The theory of planned behavior: Reactions and reflections. *Psychology & Health* 26: 1113–27. [CrossRef]

Baumeister, Roy F., Kathleen D. Vohs, and Dianne M. Tice. 2007. The strength model of self-control. *Current Direction in Psychological Science* 16: 351–55. [CrossRef]

Black, Donald W., Martha Shaw, Brett McCormick, and Jeff Allen. 2013. Pathological gambling: Relationship to obesity, self-reported chronic medical conditions, poor lifestyle choices, and impaired quality of life. *Comprehensive Psychiatry* 54: 97–104. [PubMed]

Black, Donald W., William Coryell, Brett McCormick, Martha Shaw, and Jeff Allen. 2017. A prospective follow-up study of younger and older subjects with pathological gambling. *Psychiatry Research* 256: 162–68. [PubMed]

Brevers, Damien, Jennifer Foucart, Ofir Turel, Anais Bertrand, Mikael Alaerts, Paul Verbanck, Charles Kornreich, and Antoine Bechara. 2018. The impact of self-control cues on subsequent monetary risk-taking. *Journal of Behavioral Addictions* 7: 1044–55. [PubMed]

Central Bank of Kenya, Kenya National Bureau of Statistics, and FSD Kenya. 2019. FinAccess Household Survey. Available online: https://fsdkenya.org/publication/finaccess2019/ (accessed on 18 March 2020).

Chamboko, Richard, Alessandro Re, and Sevias Guvuriro. 2017. Mapping Patterns of Multiple Deprivation in Namibia. *International Journal of Social Economics* 44: 2486–99.

Chamboko, Richard, Fabian Reitzug, Robert Cull, Sorein Heitmann, and Morne Van Der Westhuizen. 2020. *The Role of Gender in Agent: Evidence from Democratic Republic of Congo*. Policy Research Working Paper No. 9449. Washington, DC: World Bank.

Chamboko, Richard, Soren Heitmann, and Morne Van Der Westhuizen. 2018. *Women and Digital Financial Services in Sub-Saharan Africa: Understanding the Challenges and Harnessing the Opportunities*. Washington, DC: World Bank.

Effertz, Tobias, Anja Bischof, Hans-Jürgen Rumpf, Christian Meyer, and Ulrich John. 2018. The effect of online gambling on gambling problems and resulting economic health costs in Germany. *The European Journal of Health Economics* 19: 967–78. [CrossRef]

Fujita, Kentaro. 2011. On conceptualizing self-control as more than the effortful inhibition of impulses. *Personality and Social Psychology Review* 15: 352–66. [CrossRef]

Gainsbury, Sally M., Alex Russell, Nerilee Hing, Robert Wood, and Alex Blaszczynski. 2013. The impact of internet gambling on gambling problems: A comparison of moderate-risk and problem Internet and non-Internet gamblers. *Psychology of Addictive Behaviors* 27: 1092–101. [CrossRef]

Gainsbury, Sally M., Robert Wood, Alex Russell, Nerilee Hing, and Alex Blaszczynski. 2012. A digital revolution: Comparison of demographic profiles, attitudes and gambling behavior of Internet and non-Internet gamblers. *Computers in Human Behavior* 28: 1388–98. [CrossRef]

Gubbins, Paul, and Edoardo Totolo. 2018. Digital Credit in Kenya: Evidence from Demand Side-Survey. *Financial Sector Deepening (FSD) Kenya*. Available online: https://fsdkenya.org/publication/digital-credit-in-kenya-evidence-from-demand-side-surveys/ (accessed on 16 April 2020).

Håkansson, Anders, and Carolina Widinghoff. 2020. Over-Indebtedness and Problem Gambling in a General Population Sample of Online Gamblers. *Frontiers in Psychiatry* 11: 7. [CrossRef] [PubMed]

iGaming Business. 2020. Kenya Betting Tax Removed as Kenyatta Signs Finance Bill. Available online: https://www.igamingbusiness.com/news/kenya-betting-tax-removed-kenyatta-signs-finance-bill#:~{}:text=Kenyan%20President%20Uhuru%20Kenyatta%20has,and%20Betin%20exiting%20the%20market (accessed on 16 April 2020).

Inzlicht, Michael, Brandon J. Schmeichel, and Neil C. Macrae. 2014. Why self-control seems (but may not be) limited. *Trends in Cognitive Sciences* 18: 127–33. [CrossRef] [PubMed]

King, Daniel L., Paul H. Delfabbro, Dean Kaptsis, and Tara Zwaans. 2014. Adolescent simulated gambling via digital and social media: An emerging problem. *Computers in Human Behavior* 31: 305–13. [CrossRef]

Kisambe, Samuel. 2017. Kenya Boasts of Having the Most Young Gamblers in Africa. CGTN Africa. Available online: https://africa.cgtn.com/2017/04/07/kenya-boasts-of-having-the-most-young-gamblers-in-africa/ (accessed on 12 February 2020).

LaPlante, Debi A., Sarah E. Nelson, and Heather M. Gray. 2014. Breadth and depth involvement: Understanding Internet gambling involvement and its relationship to gambling problems. *Psychology of Addictive Behaviors* 28: 396. [CrossRef] [PubMed]

Mallorquí-Bagué, Nuria, Fernando Fernández-Aranda, María Lozano-Madrid, Roser Granero, Gemma Mestre-Bach, Marta Baño, Amparo D. Pino-Gutiérrez, Monica Gómez-Peña, Neus Aymamí, José M. Menchón, and et al. 2017. Internet gaming disorder and online gambling disorder: Clinical and personality correlates. *Journal of Behavioral Addictions* 6: 669–77. [CrossRef] [PubMed]

McEachan, Rosemary R. C., Mark Conner, Natalie J. Taylor, and Rebecca J. Lawton. 2011. Prospective prediction of health-related behaviors with the Theory of Planned Behavior: A meta-analysis. *Health Psychology Review* 5: 97–144. [CrossRef]

MicroSave Consulting. 2019. *Making Digital Credit Truly Responsible: Insights from Analysis of Digital Credit in Kenya*. Nairobi: MSC.

Mihaylova, Tsvetelina, Sylvia Kairouz, and Louise Nadeau. 2013. Online poker gambling among university students: Risky endeavour or harmless pastime? *Journal of Gambling Issues* 1–18. [CrossRef]

Msulwa, Baraka, Richard Chamboko, Celina Lee, Jaco Weideman, and Krista Nordin. 2020. The Impact of Formal Financial Services Uptake on Asset Holdings in Kenya: Causal Evidence from a Propensity Score Matching Approach. *African Review of Economics and Finance*. Available online: https://african-review.com/online-first-details.php?id=4 (accessed on 25 September 2020).

Munyegera, Ggombe Kasim, and Tomoya Matsumoto. 2016. Mobile Money, Remittances, and Households Welfare: Panel Evidence from Rural Uganda. *World Development* 79: 127–37. [CrossRef]

Nigro, Giovanna, Olimpia Matarazzo, Maria Ciccarelli, Francesca D'Olimpio, and Marina Cosenza. 2019. To chase or not to chase: A study on the role of mentalization and alcohol consumption in chasing behavior. *Journal of Behavioral Addictions* 8: 743–53.

Oksanen, Atte, Iina Savolainen, Anu Sirola, and Markus Kaakinen. 2018. Problem gambling and psychological distress: A cross-national perspective on the mediating effect of consumer debt and debt problems among emerging adults. *Harm Reduction Journal* 15: 1–11. [CrossRef]

Orford, Jim. 2011. An unsafe bet. In *The Dangerous Rise of Gambling and the Debate We Should Be Having*. Birmingham: Wiley.

Papineau, Elisabeth, Guy Lacroix, Serge Sevigny, Jean-Francois Biron, Nicolas Corneau-Tremblay, and Fanny Lemétayer. 2018. Assessing the differential impacts of online, mixed, and offline gambling. *International Gambling Studies* 18: 69–91. [CrossRef]

Prasad, Sambhu, and Prakash O. Jiriwal. 2019. Pathological Gambling Disorder: An Overview. *Journal of Clinical & Diagnostic Research* 13: 1–5. [CrossRef]

Roxana, Elliott. 2019. Gambling in Kenya: Mobile Phones and Football Boost Popularity. Available online: https://www.geopoll.com/blog/gambling-kenya-mobile-phones-football/ (accessed on 10 June 2020).

Sacco, Paul, Luis R. Torres, Renee M. Cunningham-Williams, Carol Woods, and Jay G. Unick. 2011. Differential item functioning of pathological gambling criteria: An examination of gender, race/ethnicity, and age. *Journal of Gambling Studies* 27: 317–30. [PubMed]

Schmidt, Mario. 2019. 'Almost everybody does it . . . ' gambling as future-making in Western Kenya. *Journal of Eastern African Studies* 13: 739–57.

Schmidt, Mario. 2020. Gambling against the Kenyan State. *Africa at LSE* 1–10. Available online: http://eprints.lse.ac.uk/id/eprint/103749 (accessed on 23 September 2020).

Suri, Tavneet, and William Jack. 2016. The Long-Run Poverty and Gender Impacts of Mobile Money. *Science* 354: 1288–92. [CrossRef]

Van Rooij, Antonius J., Mariek V. Abeele, and Jan Van Looy. 2017. OP-119: Examining the role of (un) conscious determinants in online gambling: Complementing the theory of planned behavior with the concept of habit. *Journal of Behavioral Addictions* 6: 57–58.

Wieser, Christina, Miriam Bruhn, Johannes Kinzinger, Christian Ruckteschler, and Soren Heitmann. 2019. The Impact of Mobile Money on Poor Rural Households Experimental Evidence from Uganda. In *Policy Research Working Paper 8913*. Washington, DC: World Bank.

Williams, Robert J., Rachel A. Volberg, Rhys M.G. Stevens, Lauren A. Williams, and Jennifer N. Arthur. 2017. *The Definition, Dimensionalization, and Assessment of Gambling Participation*. Alberta: Canadian Consortium for Gambling Research.

Zhang, Melvyn, Yi Yang, Song Guo, Chris Cheok, Kim E. Wong, and Gomathinayagam Kandasami. 2018. Online gambling among treatment-seeking patients in Singapore: A cross-sectional study. *International Journal of Environmental Research and Public Health* 15: 832. [CrossRef]