1. Appendix 1

1.1 The Rightmost Digit

We needed to decide which digit or digits related to realised profit and closing price were those that most influenced an individual's trading decision. Profits are displayed to investors including up to two decimal places. However, in order to examine to what extent investors may be subject to the LDE, we took the view that investors are unlikely to focus on the digits after the decimal point. Rapidly changing prices in these markets would prevent investors from determining precisely what realised profit they achieved. Therefore, we concentrated only on realised profit before the decimal point.

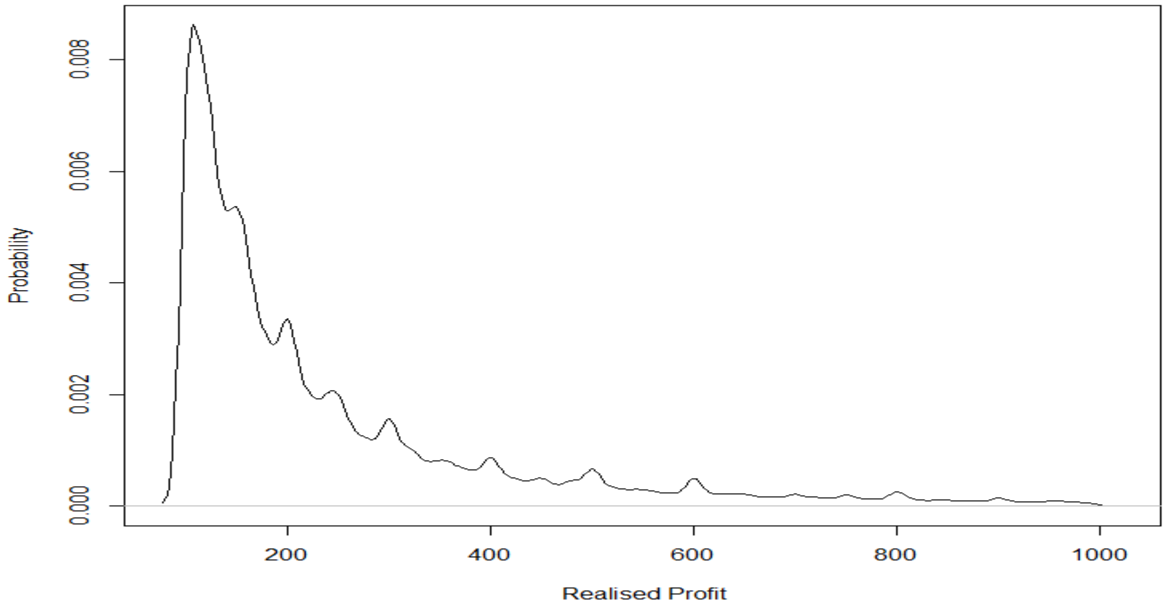
According to Lin and Wang (2017) the psychological boundary for the LDE in price is three digits. The LDE is extremely weak or non-existent if the numbers are four digits or more. They explain this by adapting the Weber-Fechner law on stimulus which states – based on log-linear modelling – that the perceived difference between the preceding numbers and round numbers becomes negligible as the absolute magnitude increases. Given that a substantial number of our trades had a three-digit profit or loss we needed to confirm whether the digit of focus for traders was the rightmost digit or the middle digit. We conducted this analysis (see details in Section 1.2) and found that in this case it was the rightmost digit. In addition, as the vast majority of trades resulted in profits of two digits or less, we only explore the LDE associated with the rightmost digit in realised profit and closing price.

1.2 Three Digit Profit

Out of 7,314,570 trades, 672,326 had a realised profit of three digits. We sought to determine whether for these trades, the middle digit or the rightmost digit is the centre of traders' focus.

The three digit profits have an inter-quantile range of 165 and median value of 173. This implies that the majority of trades are closed with realised profit closer to the lower bound of 100 than to the upper bound of 999, suggesting a non-uniform asymmetric distribution. This is confirmed by the Kernel probability density plot shown in figure 1. In order to employ a contingency table, we had to generate expected frequency values tailored to our distribution.

Figure A1:1. Probability distribution plot of three digit-realised profit.



To achieve this, the data was categorised into 900 realised profit points and the number of trades closed in each category was determined. Our data appears to resemble a decaying horizontal asymptote, underlining a curvilinear relationship. Furthermore, our model has two variables – a dependent variable of frequency and the independent variable of profit. With only one independent variable, polynomial regression to the n^{th} degree provided a flexible and ideal solution to estimating the relationship, within the linear only least square (OLS) estimation framework for uncomplicated coefficient estimation.

However, as polynomial regression utilises the least squares (OLS) estimation framework, it struggles to provide an accurate estimate when the data sample has numerous outliers (Barros and Barreto 2013). As can be seen in Figure A2: 1, there appear to be visible spikes on round numbers for realised profit. We also expect there to be a LDE or over-representation at these data points when the rightmost digit is a round number. Therefore, for the sake of simplification, we discard known outliers. Thus, all realised profit points ending with 0 and 5 were removed from our sample resulting in 720 values of three digit-realised profit. We substituted the 180 excluded price points with predictions made from our model as expected frequency values.

In a polynomial model defining a nonlinear relationship, traditional units of measures such as R^2 or adjusted R^2, although important for determining goodness of fit, are not ideal. Consequently, to see how well our model predicted missing round values we utilise a metric known as Predictive R^2 (Hopper 2014). While R^2 is determined via calculating residual sum of squares (RSS), Predictive R^2 is determined by predictive residual error sum of squares or the PRESS statistic. It calculates the RSS of the missing values within or outside the model-building sample (Tarpey 2000). Research has relied on the PRESS statistics for cross-validation purposes to determine the fit of models with significant amounts of missing or extrapolated data (Noordin et al, 2004). Predictive R^2 will always be smaller than R^2 as it is a more conservative statistic ensuring the model is not over fitted. The model we fitted was as follows:

$$\boldsymbol{Frequency = \beta_0 + \beta_1 ProfitPoint + \beta_2 ProfitPoint^2 + \beta_3 ProfitPoint^3 + \beta_4 ProfitPoint^4}$$
$$\boldsymbol{+ \beta_5 ProfitPoint^5 + \beta_6 ProfitPoint^6 + \beta_7 ProfitPoint^7 + \beta_8 ProfitPoint^8 + \mathcal{E}} \quad \textbf{(1),}$$

where *Frequency* is the number of trades realised at that particular *ProfitPoint* (e.g. 100). β_n indicates the coefficients of the polynomial terms of *ProfitPoint*, and $\mathcal{E}$ is the OLS error term.

Table A1:1. Value of β_n coefficients and their standard errors obtained from estimating Equation (1).

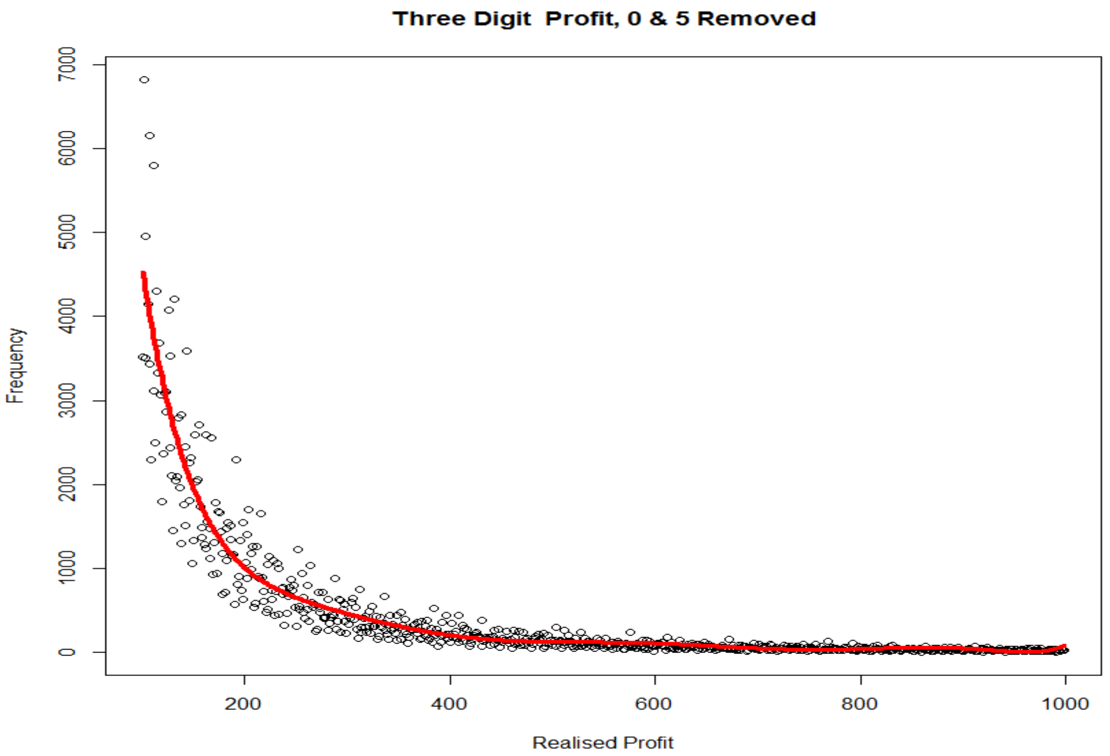
Variable	**Coefficient**	**Std. Error**	**p-value**	**Variable**	**Coefficient**	**Std. Error**	**p-value**
Intercept	406.62	10.22	<0.001**	*ProfitPoint*^{5}	-3,353.11	274.12	<0.001**
ProfitPoint	-13,533.97	274.12	<0.001**	*ProfitPoint*^{6}	2,117.49	274.12	<0.001**
ProfitPoint^2	11,133.44	274.12	<0.001**	*ProfitPoint*^{7}	-1,360.49	274.12	<0.001**

ProfitPoint^3	-7,911.15	274.12	<0.001**	*ProfitPoint*^{8}	993.95	274.12	<0.001**
ProfitPoint^4	5,237.66	274.12	<0.001**				

F-statistic: 691.3 ,DF=8 .Significant at 99% confidence interval**

The results of estimating Eq. 1 are shown in table A2: 1. All independent variables based on the p-values obtained from the t-tests are highly significant, suggesting they are robust in predicting the frequency of expected trades at each price point. Our model consists of polynomials to the order 8 in a hierarchy. This is a preferable outcome as they are invariant or unchanged under linear transformation, which occurs during OLS estimation of polynomials, thereby improving the robustness of the results (Montgomery et al, 2012). Equation (1) generates an R^2 of 0.8861, adjusted R^2 of 0.8848, and predictive R^2 of 0.8778. Such minor differences between these suggests that, due to ideal variable selection, our model is robust in its estimation of missing round number values and is neither under- or over-fitted. In addition, the predicted values generated from Equation (1) are strongly and positively correlated to observed values (Pearson's correlation coefficient= 0.9413). The resulting predicted frequency of observations of trades associated with each of the three-digit profit values are shown in figure A1:2.

Figure A1: 2. The curve generated by Equation (1), fitted over 720 points of realised profit, with round number profits ending in 0 and 5 discarded.



Using Equation (1) to predict the missing data points when the rightmost digits are round numbers, we construct the contingency table shown in table A2: 2.

Table A1: 2. Contingency Table generated from expected values estimated by Equation (1)

No. Data Points	Middle Digit/Rightmost Digit	Expected Frequency	Observed Frequency
9	*0/0*	12,034.64 (1.79%)	93,480 (13.90%
9	*5/0*	6,050.93 (0.90%)	37,595 (5.59%)
90	*Other/0*	52,912.06 (7.87%)	166,761 (24.80%)
9	*0/5*	11,160.61 (1.66%)	13,688 (2.04%)
9	*5/5*	5,714.77	5,675

		(0.85%)	(0.84%)
90	*Other/5*	49,752.12 (7.40%)	62,363 (9.28%)
90	*0/Other*	89,688.29 (13.34%)	52,098 (7.75%)
90	*5/Other*	45,852.63 (6.82%)	25,689 (3.82%)
504	*Other/Other*	3,99,159.95 (59.37%)	214,977 (31.96%)

Pearson's goodness of fit test for table, $\chi^2(8, N = 672{,}326) = 1{,}074{,}000.00$, $p < 0.001$** rightmost digit.

Post hoc two-sided proportions test of the combinations *Other/0 and Other/5* have an observed frequency more than the expected frequency ($\chi^2(1, N = 672{,}326) = 70{,}524.00$, $p = < 0.001$ and $\chi^2(1, N = 672{,}326) = 1{,}547.3$, $p = < 0.001$). By contrast, *0/Other* and *5/Other* have an observed frequency less than the expected frequency ($\chi^2(1, N = 672{,}326) = 11{,}140.00$, $p = < 0.001$) and $\chi^2(1, N = 672{,}326) = 6{,}001.08$, $p = < 0.001$).

The results of the two-sided proportion tests suggest that the rightmost digit being a round number is more salient than the middle digit in determining when a trade is realised. In particular, the combinations *0/Other* and *5/Other* represent potential round-number bias in the middle digit, while the combinations *Other/0* and *5/Other* represent round-number bias in only the rightmost digit. Our results tell us that, when given a choice between the middle digit or the rightmost digit of realised profit being a round number, investors primarily focus on the latter. Given this evidence, and the fact that the vast majority of trades end in only a two digit (or less) profit, we focus all our analysis for the entire dataset of 7,314,570 trades on the rightmost digit of profit.

2. Appendix 2

Table A2:1. Distribution of Rightmost Digit of Profit and Associated Two-sided Proportions Tests.

Rightmost Digit	Expected Frequency	Profit Observed	χ^2	DF	Adjusted p-value
0	731,457 (10%)	1,561,368 (21.35%)	356,6230.00	1	0.000**
1	731,457 (10%)	821,214 (11.23%)	5,804.60	1	0.000**
2	731,457 (10%)	899,110 (12.29%)	19,400.00	1	0.000**
3	731,457 (10%)	631,272 (8.63%)	8,121.80	1	0.000**
4	731,457 (10%)	690,524 (9.44%)	1,305.10	1	0.000**
5	731,457 (10%)	850,132 (11.62%)	9,984.10	1	0.000**
6	731,457 (10%)	598,615 (8.18%)	14,594.00	1	0.000**
7	731,457 (10%)	436,336 (5.97%)	81,052.00	1	0.000**
8	731,457 (10%)	482,366 (6.59%)	55,741.00	1	0.000**
9	731,457 (10%)	343,633 (4.70%)	151,000.00	1	0.000**

Pearson's goodness of fit test for Table 1, $\chi^2(9)$ =460,000.00, p =<0.001**, N = 7,314,570. Adjusted p-values obtained from the Holm-Bonferroni method. Significant at 99% confidence interval **

Table A2:2. Distribution of Rightmost Digit of Closing Price and Associated Two-sided Proportions Tests

Rightmost Digit	Expected Frequency	Closing Price Observed	χ^2	DF	Adjusted p-value
0	731,457 (10%)	849,882 (11.62%)	9,943.40	1	0.000**
1	731,457 (10%)	691,509 (9.45%)	1,242.30	1	0.000**

2	731,457 (10%)	714,251 (9.76%)	2,27.21	1	0.000**
3	731,457 (10%)	710,305 (9.71%)	344.21	1	0.000**
4	731,457 (10%)	713,334 (9.75%)	252.21	1	0.000**
5	731,457 (10%)	787,727 (10.77%)	2,325.70	1	0.000**
6	731,457 (10%)	713,369 (9.75%)	251.23	1	0.000**
7	731,457 (10%)	713,576 (9.75%)	245.49	1	0.000**
8	731,457 (10%)	716,756 (9.80%)	165.61	1	0.000**
9	731,457 (10%)	703,861 (9.62%)	588.25	1	0.000**

Pearson's goodness of fit test for Table 2, $\chi^2(9)$ =29,370.00, p =<0.001**, N= 7,314,570. Adjusted p-values obtained from the Holm-Bonferroni method. Significant at 99% confidence interval **

Table A2:3. Contingency Table for Profit and Closing Price Rightmost Digit Combinations and Associated Two-sided Proportions Tests Based on 10% Samples of the Whole Sample (731,457 trades per sample: rudimentary bootstrapping)

Digit Profit / Price	**Expected Frequency**	**Frequency Observed[1]**	χ^2	**DF**	**Adjusted p-value**
0/0	7,314.57 (1%)	18,579 (2.54%)	4,987.80	1	0.000**
0/5	7,314.57 (1%)	16,897 (2.31%)	3,855.50	1	0.000**
0/Other	58,516.56 (8%)	118,862 (16.25%)	23362.00	1	0.000**
5/0	7,314.57 (1%)	10,900 (1.49%)	714.27	1	0.000**
5/5	7,314.57 (1%)	9,143 (1.25%)	205.22	1	0.000**
5/Other	58,516.56 (8%)	65,319 (8.93%)	408.10	1	0.000**

Other/0	58,516.56 (8%)	55,737 (7.62%)	73.30	1	0.000**
Other/5	58,516.56 (8%)	53,542 (7.32%)	239.06	1	0.000**
Other/Other	468,132.48 (64%)	382,478 (52.29%)	20607.00	1	0.000**

Pearson's goodness of fit test for Table 1, $\chi^2(8)$ =111,360.00, p =<0.001** N= 731,457. Adjusted p-values obtained from the Holm-Bonferroni method. Significant at 99% confidence interval **.
[1] Observed frequencies are the mean values ten fundamental bootstrapping random samples.

Table A2:4. Distribution of Rightmost Round Digits *0* and *5* for Profit and Closing Price for Traders with the Least and Greatest Number of Trades, with Associated Two-sided Proportions Tests.

Trader Classification by Number of Trades	Rightmost Digit 0 Profit	Rightmost Digit 5 Profit	Rightmost Digit 0 Price	Rightmost Digit 5 Price
Bottom Quartile 6,425 traders who made between 1 to 9 trades Total trades: 26,342	**Frequency Expected:** 2,634.20 (10%) Frequency Observed: 7,057 (26.79%) ($\chi^2(1)$ =2,472.30, p =<0.001**. N=26,342)	**Frequency Expected:** 2,634.20 (10%) Frequency Observed: 2,642 (10.03%) ($\chi^2(1)$ =0.001, p =0.9214 N=26,342)	**Frequency Expected:** 2,634.20 (10%) Frequency Observed: 3,367 (12.78%) ($\chi^2(1)$ =100.71, p =<0.001**. N=26,342)	**Frequency Expected:** 2,634.20 (10%) Frequency Observed: 2,869 (10.89%) ($\chi^2(1)$ =11.09, p =<0.001**. N=26,342)
Top Decile 2,570 traders who made between 607 to 61,999 trades Total Trades: 5,264,711	**Frequency Expected:** 526,471.10 (10%) Frequency Observed: 1,177,716 (22.37%) ($\chi^2(1)$ =29,6930.00, p =<0.001**. N=5,264,711)	**Frequency Expected:** 526,471.10 (10%) Frequency Observed: 618,603 (11.75%) ($\chi^2(1)$ =8,317.20, p =<0.001**. N=5,264,711)	**Frequency Expected:** 526,471.10 (10%) Frequency Observed: 614,918 (11.68%) ($\chi^2(1)$ =7,686.90, p =<0.001**. N=5,264,711)	**Frequency Expected:** 526,471.10 (10%) Frequency Observed: 569,115 (10.81%) ($\chi^2(1)$ = 1,852.50, p =<0.001**. N=5,264,711)
Top One Percent of Traders 257 traders who made between 4,024 to 61,999 trades	**Frequency Expected:** 202,163.70 (10%)	**Frequency Expected:** 202,163.70 (10%)	**Frequency Expected:** 202,163.70 (10%)	**Frequency Expected:** 202,163.70 (10%)

Total Trades: 2,021,637	Frequency Observed:	Frequency Observed:	Frequency Observed:	Frequency Observed:
	408,573 (20.21%)	219,145 (10.84%)	229,254 (11.34%)	208,835 (10.33%)
	($\chi^2(1)$ =82,171.00, p =<0.001**. N=2,021,637)	($\chi^2(1)$ = 763.98, p =<0.001**. N=2,021,637)	($\chi^2(1)$ =1904.00, p =<0.001**. N=2,021,637)	($\chi^2(1)$ =120.50, p =<0.001**. N=2,021,637)

Adjusted p-values obtained from the Holm-Bonferroni method. Significant at 99% confidence interval **

Table A2:5. Comparing the LDE when an Individual Trade is in Profit or Loss for the Metrics of Profit and Closing Price, , Alongside the Two-sided Proportions Tests.

Total Trades	Expected Frequency	Frequency Observed	χ^2	DF	Adjusted p-value
Realised Profit:Profit 4,517,229 trades (61.76%)	451,722.90 (10%)	892,403 (19.76%)	16,7930.00	1	0.000**
Realised Profit:Loss 2,797,341 trades (38.24%)	279,734.10 (10%)	668,965 (23.91%)	192,300.00	1	0.000**
Closing Price:Profit 4,517,229 trades (61.76%)	451,722.90 (10%)	495,303 (10.96%)	2,240.20	1	0.000**
Closing Price:Loss 2,797,341 trades (38.24%)	279,734.10 (10%)	354,579 (12.66%)	9960.30	1	0.000**

Adjusted p-values obtained from the Holm-Bonferroni method. Significant at 99% confidence interval ** .Results based on the sample of 7,314,570 trades.

Table A2:6. Distribution of Rightmost Digit *0* in the Closing Profit of Trades, for each Year Represented in the Sample of 7,314,570 Individual Trades, and Associated Two-sided Proportions Tests.

Year	Total Trades	Rightmost Digit Profit 0 Expected Frequency	Rightmost Digit Profit 0 Frequency Observed	χ^2	DF	Adjusted p-value
2006	9,873	987.30 (10%)	2,733 (27.68%)	1,008.20	1	0.000**
2007	587,044	58,704.40 (10%)	148,112 (25.23%)	46,914.00	1	0.000**
2008	1,050,533	105,053.00 (10%)	214,413 (20.41%)	44,148.00	1	0.000**
2009	1,279,137	127,913.70 (10%)	271,491 (20.93%)	61,161.00	1	0.000**
2010	1,546,982	154,698.20 (10%)	352,442 (22.78%)	92,219.00	1	0.000**
2011	1,576,274	157,627.40 (10%)	318,250 (20.19%)	63,853.00	1	0.000**
2012	1,058,449	105,844.90 (10%)	211,372 (19.97%)	41,292.00	1	0.000**
2013*	206,278	20,627.80 (10%)	42,555 (20.63%)	8,985.10	1	0.000**

*The year of 2013 includes trades till March 2013. Adjusted p-values obtained from the Holm-Bonferroni method.
Significant at 99% confidence interval **

Table A2:7. Distribution of Rightmost Digit *0* in the Closing Price of Trades, for each Year Represented in the Sample of 7,314,570 Individual Trades, and Associated Two-sided Proportion Tests.

Year	Total Trades	Rightmost Digit Price 0	Rightmost Digit Price 0	χ^2	DF	Adjusted p-value

		Expected Frequency	Frequency Observed			
2006	9,873	987.30 (10%)	1,266 (12.82%)	38.63	1	0.000**
2007	587,044	58,704.40 (10%)	71,561 (12.19%)	1,427.00	1	0.000**
2008	1,050,533	105,053.00 (10%)	118,009 (11.23%)	841.73	1	0.000**
2009	1,279,137	127,913.70 (10%)	156,625 (12.24%)	3,259.40	1	0.000**
2010	1,546,982	154,698.20 (10%)	175,428 (11.34%)	1,457.00	1	0.000**
2011	1,576,274	157,627.40 (10%)	182,217 (11.56%)	1,994.00	1	0.000**
2012	1,058,449	105,844.90 (10%)	121,192 (11.45%)	1,161.90	1	0.000**
2013*	206,278	20,627.80 (10%)	23,584 (11.43%)	221.24	1	0.000**

*The year of 2013 includes trades till March 2013. Adjusted p-values obtained from the Holm-Bonferroni method. Significant at 99% confidence interval **

Table A2:8. Distribution of Rightmost Digit Closing Profit/Price Combinations *0/Other*, for each Rightmost Digit of Closing Price (with Combinations *0/0* and *0/5* provided for Comparative Purposes), and Associated Two-sided Proportion Tests.

Profit/Price *0/Other*	**Expected Value**	**Observed Value**	χ^2	**DF**	**Adjusted p-value**
0/0	**73,145.70 (1%)**	**183,845 (2.51%)**	**48,536.00**	**1**	**0.000****
0/1	73,145.70 (1%)	146,018 (1.99%)	24,598.00	1	0.000**
0/2	73,145.70	152,151	28,138.00	1	0.000**

	(1%)	(2.08%)			
0/3	73,145.70 (1%)	151,494 (2.07%)	27,751.00	1	0.000**
0/4	73,145.70 (1%)	152,262 (2.08%)	28,203.00	1	0.000**
0/5	**73,145.70 (1%)**	**169,769 (2.32%)**	**39,082.00**	**1**	**0.000****
0/6	73,145.70 (1%)	151,990 (2.08%)	28,043.00	1	0.000**
0/7	73,145.70 (1%)	151,870 (2.08%)	27,972.00	1	0.000**
0/8	73,145.70 (1%)	152,618 (2.09%)	28,413.00	1	0.000**
0/9	73,145.70 (1%)	149,351 (2.04%)	26,403.00	1	0.000**

Adjusted p-values obtained from the Holm-Bonferroni method. Significant at 99% confidence interval **. Percentages have been rounded to two digits.

Table A2:9. Distribution of Rightmost Digit Closing Profit/Price Combinations *Other/0,* for each Rightmost Digit of Closing Profit (with Combinations *0/0* and *5/0* provided for Comparative Purposes), and Associated Two-sided Proportion Tests.

Profit/Price *Other/0*	**Expected Value**	**Observed Value**	χ^2	**DF**	**Adjusted p-value**
0/0	**73,145.70 (1%)**	**183,845 (2.51%)**	**48,536.00**	**1**	**0.000****
1/0	73,145.70 (1%)	89,205 (1.12%)	1,606.20	1	0.000**
2/0	73,145.70 (1%)	101,112 (1.38%)	4,542.00	1	0.000**

3/0	73,145.70 (1%)	71,500 (0.98%)	18.89	1	0.000**
4/0	73,145.70 (1%)	80,155 (1.10%)	323.78	1	0.000**
5/0	**73,145.70 (1%)**	**99,680 (1.37%)**	**4,122.30**	**1**	**0.000****
6/0	73,145.70 (1%)	70,950 (0.96%)	33.76	1	0.000**
7/0	73,145.70 (1%)	52,387 (0.72%)	3462.10	1	0.000**
8/0	73,145.70 (1%)	59,038 (0.81%)	1,519.20	1	0.000**
9/0	73,145.70 (1%)	42,000 (0.57%)	8490.90	1	0.000**

Adjusted p-values obtained from the Holm-Bonferroni method. Significant at 99% confidence interval ** Percentages have been rounded to two digits.

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