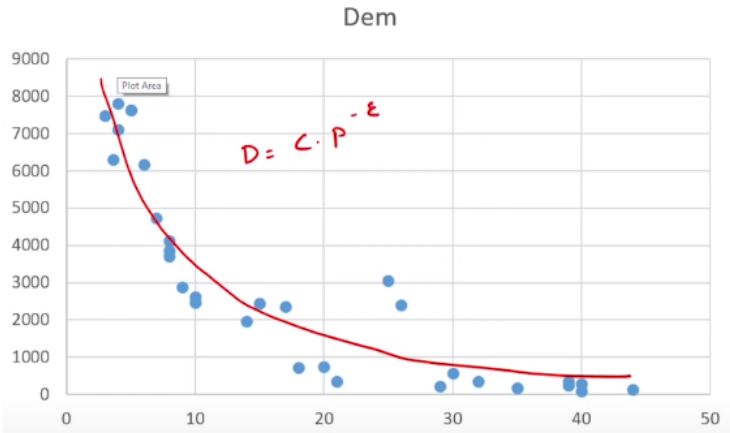
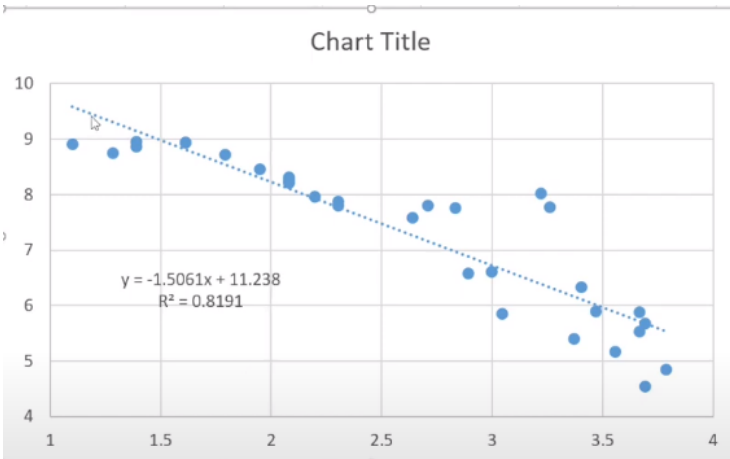


5.3 Implementing Constant Elasticity Model using Simple Linear Regression

Tuesday, 18 October 2022 13:52

Summary	<ul style="list-style-type: none">Implementing Constant Elasticity Model using SLR on Excel																																																																																																																						
	<p>This was the given data</p> <table><tr><th>Price</th><th>Dem</th></tr><tr><td>3</td><td>7479</td></tr><tr><td>3.6</td><td>6304</td></tr><tr><td>40</td><td>94</td></tr><tr><td>21</td><td>349</td></tr><tr><td>4</td><td>7095</td></tr><tr><td>30</td><td>569</td></tr><tr><td>29</td><td>224</td></tr><tr><td>18</td><td>720</td></tr><tr><td>9</td><td>2887</td></tr><tr><td>6</td><td>6164</td></tr><tr><td>5</td><td>7633</td></tr><tr><td>8</td><td>3853</td></tr><tr><td>15</td><td>2448</td></tr><tr><td>32</td><td>365</td></tr><tr><td>20</td><td>742</td></tr><tr><td>10</td><td>2629</td></tr><tr><td>17</td><td>2366</td></tr><tr><td>7</td><td>4736</td></tr></table> <p>The scatter plot of this data looks like this:</p>  <p>The graph looks like constant elasticity. So, we apply log-log transformation on the data.</p> <p>We did \ln on both variables and then plotted the scatter plot</p> <table><tr><th>Price</th><th>Dem</th><th>LN(P)</th><th>LN(Dem)</th></tr><tr><td>3</td><td>7479</td><td>1.098612</td><td>8.919854</td></tr><tr><td>3.6</td><td>6304</td><td>1.280934</td><td>8.74894</td></tr><tr><td>40</td><td>94</td><td>3.688879</td><td>4.543295</td></tr><tr><td>21</td><td>349</td><td>3.044522</td><td>5.855072</td></tr><tr><td>4</td><td>7095</td><td>1.386294</td><td>8.867146</td></tr><tr><td>30</td><td>569</td><td>3.401197</td><td>6.34388</td></tr><tr><td>29</td><td>224</td><td>3.367296</td><td>5.411646</td></tr><tr><td>18</td><td>720</td><td>2.890372</td><td>6.579251</td></tr><tr><td>9</td><td>2887</td><td>2.197225</td><td>7.967973</td></tr><tr><td>6</td><td>6164</td><td>1.791759</td><td>8.726481</td></tr><tr><td>5</td><td>7633</td><td>1.609438</td><td>8.940236</td></tr><tr><td>8</td><td>3853</td><td>2.079442</td><td>8.256607</td></tr><tr><td>15</td><td>2448</td><td>2.70805</td><td>7.803027</td></tr><tr><td>32</td><td>365</td><td>3.465736</td><td>5.899897</td></tr><tr><td>20</td><td>742</td><td>2.995732</td><td>6.609349</td></tr><tr><td>10</td><td>2629</td><td>2.302585</td><td>7.874359</td></tr><tr><td>17</td><td>2366</td><td>2.833213</td><td>7.768956</td></tr><tr><td>7</td><td>4736</td><td>1.94591</td><td>8.462948</td></tr><tr><td>39</td><td>252</td><td>3.663562</td><td>5.529429</td></tr></table> <p>Transformed scatter plot</p> 	Price	Dem	3	7479	3.6	6304	40	94	21	349	4	7095	30	569	29	224	18	720	9	2887	6	6164	5	7633	8	3853	15	2448	32	365	20	742	10	2629	17	2366	7	4736	Price	Dem	LN(P)	LN(Dem)	3	7479	1.098612	8.919854	3.6	6304	1.280934	8.74894	40	94	3.688879	4.543295	21	349	3.044522	5.855072	4	7095	1.386294	8.867146	30	569	3.401197	6.34388	29	224	3.367296	5.411646	18	720	2.890372	6.579251	9	2887	2.197225	7.967973	6	6164	1.791759	8.726481	5	7633	1.609438	8.940236	8	3853	2.079442	8.256607	15	2448	2.70805	7.803027	32	365	3.465736	5.899897	20	742	2.995732	6.609349	10	2629	2.302585	7.874359	17	2366	2.833213	7.768956	7	4736	1.94591	8.462948	39	252	3.663562	5.529429
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	<div> <div>R² = 0.8191</div> <ul style="list-style-type: none"> • $R^2 \rightarrow$ Coefficient of Determination • The given relationship between explanatory variable and response variable is able to explain 81.9% of variation in response variable (demand). • Therefore, this model looks to be a good model. </div>
	<ul style="list-style-type: none"> • We're given a data demand vs price. • We make it ln(demand) vs ln(price), and do regression statistics on it.
	Link to understand the Regression Statistics
	<p>After performing the test we got:</p> <p>Intercept: $\beta_0 = 11.238 = \ln(C)$. $\Rightarrow C = e^{11.23} = 75962.87 = D(1)$.</p> <p>Slope: $\beta_1 = -1.506 = -\epsilon$. $\Rightarrow \epsilon = 1.506$.</p> <ul style="list-style-type: none"> • $\epsilon > 1 \Rightarrow$ Highly elastic product.