

i) For each product pair calculate the proportion of households buying P1 and P2 that are purchased in distinct baskets  "I HHDs (P1P3 distinct baskets) = HHDs (P1P2 distinct baskets)  "I (dentate the average proportion in the category  average distinct basket proportion = mean ("IHHDs (P1P3) distinct baskets))  across all product Pairs		3- caculate the expected # buying products P, and P= in distinct base
To HHDs (P.P.S distinct baskets) = HHDs (P.P.S distinct baskets)  ii) (deviate the average proportion in the category  average distinct basket proportion = Mean (Yo HHDs (P.P.S distinct baskets))  across all product pairs  iii) E[HHDs (P.B. different baskets)] = E[HHDs (P.B.)] ** mean (Yo HHDs (P.B.) different baskets)  E[HHDs (P.B. different baskets)] is the expected number of households purchasing Proportion of households that only buy P. and by the average proportion of households that only buy P. and in distinct baskets so the resulting Expected on the expected of households buy P. and P. adjusted by the average proportion of distinct baskets in the commodity. This ** will be used as the base line to compare actual distinct basket product pair household counts  Step 4 - Calculate a partial index for each product poir  Partial Index (P.P.S.) = HHDs (P.P.S. different baskets)  E[HHDs (P.R.S. different baskets)  E[HHDs (P.R.S. different baskets)  I calculate the Medican for all partial indices		calculate the average percentage of household buying any two produ
ii) Colemate the average proportion in the category  average distinct Gosket proportion = mean (1/6 HHDs (P.P. distinct baskets))  across all product pairs  iii) E[HHDs (P.P. different baskets)] = E[HHDs (P.P.)] * mean (8/6 HHDs (P.P.) different baskets)  E[HHDs (P.P.) different baskets)] is the expected number of households parchasing Proportion of households that only buy Proportion alistinct baskets so the resulting Expectation is the expected to distinct baskets so the resulting Expectation is the expected of distinct baskets for the commodity. This # will be used as the base line to commove actual distinct basket product pair household counts  Step 4 - Calculate a partial index for each product poir  Partial Index (P.P.) = HHDs (P.P.) different baskets)  E[HHDs(P.P.) different baskets)  E[HHDs(P.P.) different baskets)  Calculate a partial index for each product poir		
average distinct basket proportion = mean (16HHDs (P.P. distinct baskets))  across all product pairs  iii) E[HHDs (P.P. different baskets)] = E[HHDs (P.P.)] * mean (90HHDs (P.P.) different baskets)  E[HHDs (P.P. different baskets)] is the expected number of households purchasing Proportion of households in purchasing Proportion of households that only buy Proportion distinct baskets so the resulting Expectation is the expected of the average proportion of distinct baskets for the commodity. This is twill be used as the base line to compare actual distinct basket product pair household counts  Step 4 - Calculate a partial index for each product poir  Partial Index (P.P.) = HHDr (P.P.) different baskets)  E[HHDs (P.P.) different baskets)  E[HHDs (P.P.) different baskets)  i) Calculate the Medican for all partial indices		
across all product pairs  iii) E[HHDs(P,B different baskets)] = E[HHDs(P,B)] ** mean(90HHDs(P,B) different baskets)  E[HHDs(P,B different basket)] is the expected number of households purchasing Product assuming independence of P, and P, mutipled by the average proportion of households that only buy P, and in distinct baskets so the resulting Expectation is the expected that of households buy P, and P2 adjusted by the average proportion of distinct baskets in the commodity. This H will be used as the base line to compare actual distinct basket product pair household counts  Step4 - Calculate a partial index for each product poir  Partial Index (P,P3) = HHDs(P,P3) different baskets)  E[HHDs(P,P3) different baskets)  Step 5 - Calculate Substitutability Index for each product pair  i) calculate the median for all partial indices		
across all product pairs  iii) E[HIDs(P,B) different baskets)] = E[HHDs(P,B)] ** mean(90 HHDs(P,B) different baskets)  E[HIDs(P,B) different basket)] is the expected number of households  purchasing Product assuming independence of P, and P, mutipled  by the average proportion of households that only buy P, and in distinct baskets so the resulting Expectation is the expected  # of households buy P, and P2 adjusted by the average proportion of plastinct baskets in the commodity. This # will be used  as the base line to compare actual distinct basket product  pair household counts  Step4 - Calculate a partial index for each product poir  Partial Index (P,P3) = HHDs(P,P3 different baskets)  E[HHDs(P,P3 different baskets)  Step 5 - Calculate Substitutability Index for each product pair  i) calculate the Median for all partial indices		average distinct basket proportion = mean (%HHDs(P; P; distinct baskets))
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Step 4 - Calculate a partial index for each product poir  Partial Index (P.P.) = HHDs (P.P. different baskets)  E[HHDs(P.P. different baskets)  Step 5 - Calculate Substitutability Index for each product poir  i) Calculate the median for all partial indices		as the base line to compare actual distinct basket product
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Step 5 - calculate Substitutability Index for each product point  i) calculate the median for all partial indices		Partial Index (P.P.) = HHDs (P.P. different baskets)
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i) calculate the median for all partial indices		
i) calculate the median for all partial indices	Ste	ip 5 - Calculate Substitutability Index for each product poin
u) Sub index (P.P.) = Partial Index (P.P.)  Median (Partial Index (P.P.))		
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		U) Sub index (P.P.) = Partial Index (P.P.)
		ii) Sub index (P.P.) = Partial Index (P.P.)  Median (Partial Index (P:P.))
		ii) Sub index (P.P.) = Partial Index (P.P.)  Median (Partial Index (PiP))
		ii) Sub index (P.P.) = Partial Index (P.P.)  Median (Partial Index (PiP))
		ii) Sub index (P.P.) = Pirtial Index (P.P.)  Median (Partial Index (PiP))

The exclude any product pair with partial index less than or equal to one (because less than one Cannot be a substitute)  Chi Start (P.Ps.) = (HIDS (P.Ps. different booked) - E[HIDS (P.B. different booked)]) <sup>2</sup> Chi Start (P.Ps.) = (HIDS (P.Ps. different booked) - E[HIDS (P.B. different booked)]) <sup>2</sup> Shep 7 - calculate the Chi squire percentage for P.I. with each potential substitute (only products that have partial index greater than one)  The substitute for the sale for P.I. with each partial index greater than one)  To all Chi Start (P.Ps.)  So for example if products Ps. Ps., and Py were the over indexing substitutes for product Ps. then the substitute Ps. with Ps. would be  *(Chi (P.Ps.) = Chi Start (P.Ps.) + Chi Start (P.Py.)  Substitute pairs are determined by step 5 in the sub index and step 7 attemps to measure the startistical Strength of the relationship between substitute pairs using the Chi squared startistic				In square	d Statisti	ic for e	ach ove	r indexin	g produc
We exclude any product pair with partial index less than or equal to one (because less than one cannot be a substitute)  Chi Stat (P.P.) = (HHDs(P.P.) different boskets) - E[HHDs(P.B.) different boskets)]  Chi Stat (P.P.) = (HHDs(P.P.) different boskets)  Step 7 - calculate the Chi Somer percentage for P1 with each potential substitute (Tonly products that have partial index greater than one)  % chi (P.P.) = Chi-Stat (P.P.)  So for example if products P2 P3, and Py were the over indexing substitutes for product P1 than the substitute P2 with P3  would be  % chi(P.P.) = Chistot (P.R.) + Chistot (P.P.)  Substitute pairs are determined by step 5 in the sub index and step 7 attemps to measure me statistical strength of the relationship between substitute pairs wing the Chi-Sometal		Pall							
We exclude any product pair with interval index less than or equal to one (because less than one cannot be a substitute)  Chi Stat (P.P.) = (HHDs(P.P.) different baskets) - E[HHDs(P.B. different baskets)]  Chi Stat (P.P.) = (HHDs(P.P.) different baskets)  Step 7 - calculate the Chi Square percentage for P.I with each potential substitute (Tonly products that have partial index greater than one)  % chi (P.P.) = Chi-Stat (P.P.) that for P) subs  So for example if products P2 P3, and P4 were the over indexing substitutes for product P1 than the sub index about be  % chi (P.P.) = Chistot (P.P.) + Chistot (P.P.)  Chistot (P.P.) + Chistot (P.P.) + Chistot (P.P.)  Substitute pairs are determined by step 5 in the sub index and step 7 attemps to measure the statistical strength of the relationship between substitute Pairs using the Chi-squared		7 = (X	(-W)2						
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Chi Stat (P.P.) = (HHD) (P.P.) different baskets) - E[HHD) (P.P.) different baskets)  Step 7 - calculate the Chi square percentage for P. with each potential substitute (Ionly products that have partial index greater than one)  % chi (P.P.) = Chi-Stat (P.P.) the substitute substitute for PI subs  so for example if products P2, P3, and P4 were the over indexing substitutes for product P1 then the %chi for P1 with P3 would be  % chi (P.P.) = Chistat (P.P.) + Chistat (P.P.)  % chi (P.P.) = Chistat (P.P.) + Chistat (P.P.)  Substitute pairs are determined by Step 5 in the sub index and step 7 attemps to measure the statistical Strength of the relationship between substitute pairs using the Chi-squired	We e	xclude o	My produ	LA Pair	with par	rtial ina	ex less	than o	r equal
Step 7 - calculate the Chi Square percentage for PI with each potential substitute (Fonly products that have partial index greater than one)  % chi (PiB) = Chi-Stat (PiB2) the sub index substitutes for products P2, P3, and P4 were the over indexing substitutes for product P1 then the %chi for P1 with P2 would be  % chi (PiB3) = Chistat (PiB3) +							4 4 1		
Step 7 - calculate the Chi Square percentage for PI with each potential substitute (Fonly products that have partial index greater than one)  % chi (PiB) = Chi-Stat (PiB2) the sub index substitutes for products P2, P3, and P4 were the over indexing substitutes for product P1 then the such for P1 with P2 would be  % chi (PiB3) = Chistat (PiB3) +	Chi	CINIPP)	- (HHDs (P, Ps	different bosk	ets) - E[HH]	B (P.B. different	baskels []		
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So for example if products P2, P3, and P4 were the over indexing substitutes for product P1 than the Sochi for P1 with P3 would be  Chistat (P,B) = Chistat (P,B) + Chistat (P	Clop 7	colculate	the CL	Canesanty	marcantage	for T	nh	anh	
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So for example if products P2, P3, and Py were the over indexing substitutes for product P1 then the achi for P1 with P3 would be  % Chi (P1.P3) = Chistot (P1.P3) + Chistot (P1.P3)  Substitute pairs are determined by Step 5 in the sub index and Step 7 attemps to measure the statistical Strength of the relationship between substitute pairs using the Chi-squared		% c	hi (P.B.)	= (-1/1-240	at ( 1-12)				Sub Index
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