ueqjunc1m

March 22, 2025

```
[1]: import pandas as pd
     import numpy as np
     file TS = '/content/data-Total-Sale.xlsx'
     file_ELP = '/content/data-ECommerce-Labor_Prod.xlsx'
     # Right now, the Total-Sale sheet is messy, with the 'year' as column headers.
     # Function to convert the column headers into row data and
     # group the new year rows with corresponding 'Total' values
     def fix_file_TS():
        ts = pd.read_excel(file_TS)
         ts.fillna(0, inplace=True)
         ts = ts.melt(id_vars=["NAICS"], var_name='year', value name="Total")
         # Had to assert the year values as integer, otherwise merging won't work
         ts['year']=ts['year'].astype(int)
         ts.sort_values(by=['NAICS', 'year'], ascending=[True, True],
                        inplace=True, ignore_index=True)
         return ts
     # Function to sort the existing ELP sheet based on NAICS code and year
     def sort file ELP():
         elp = pd.read_excel(file_ELP)
         elp.fillna(0, inplace=True)
         elp.sort_values(by=['NAICS', 'year'], ascending=[True, True],
                         inplace=True, ignore_index=True)
         return elp
     # Running the custom functions
     ts = fix_file_TS()
     elp = sort_file_ELP()
     f3 = pd.merge(ts, elp, how="right", on=["NAICS", "year"])
     f3.index = np.arange(1, len(f3) + 1)
     f3.to_excel("Trimmed-DATA.xlsx", index=True)
     # REFERENCES:
```

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# https://shorturl.at/WzV3S
# https://shorturl.at/UbjoJ
```

[2]: print(f3)

	NAICS	year	Total	E-commerce	Labor-Prod
1	311	1999	426000000	45757000	92.461
2	311	2000	435230000	54837000	93.886
3	311	2001	451386000	53556000	94.745
4	311	2002	460020000	51094000	99.497
5	311	2003	483226000	59576000	101.398
	•••	•••	•••	•••	
479	339	2017	148413106	75876701	100.000
480	339	2018	153741167	84385069	102.046
481	339	2019	153195877	86725244	95.969
482	339	2020	143847977	85341375	96.774
483	339	2021	161242387	96050779	102.872

[483 rows x 5 columns]

	NAICS	year	Total	E-commerce	Labor-Prod
1	311	1999	426000000	45757000	92.461
2	311	2000	435230000	54837000	93.886
3	311	2001	451386000	53556000	94.745
4	311	2002	460020000	51094000	99.497
5	311	2003	483226000	59576000	101.398
6	311	2004	512340000	64121000	101.749
7	311	2005	532402000	99090000	108.329
8	311	2006	536939000	153996000	106.875
9	311	2007	589859000	203693000	104.392
10	311	2008	649905572	247132424	103
11	311	2009	627185000	262608000	106.553
12	311	2010	649339000	300280000	105.855
13	311	2011	708683000	340436000	104.062
14	311	2012	738515000	385648803	102.927
15	311	2013	762847606	417687000	103.495
16	311	2014	793831000	467112000	104.044
17	311	2015	774132000	474998000	103.521
18	311	2016	764787000	481746000	102.448
19	311	2017	784152808	520965564	100
20	311	2018	784628928	522982851	99.385
21	311	2019	799772238	552603734	99.257
22	311	2020	826578014	595712329	101.519
23	311	2021	904147676	652192662	99.956
24	312	1999	106920000	35138000	118.993
25	312	2000	111692000	42862000	119.815
26	312	2001	118786000	45665000	121.264
27	312	2002	105691000	45419000	111.591
28	312	2003	108806000	46998000	124.793
29	312	2004	113737000	52783000	128.629
30	312	2005	124086000	60651000	136.97
31	312	2006	124033000	68046000	128.856

32	312	2007	128286000	72038000	126.454
33	312	2008	125099482	67894325	123.3
34	312	2009	127943000	77180000	128.968
35	312	2010	130551000	82329000	132.306
36	312	2011	134765000	85357000	127.108
37	312	2012	142494000	97299132	132.776
38	312	2013	147004613	102221000	124.409
39	312	2014	147010000	102220000	115.847
40	312	2015	154688000	112779000	114.587
41	312	2016	154864000	115952000	106.42
42	312	2017	155715065	122729398	100
43	312	2018	156130798	125041203	99.206
44	312	2019	156875199	124830556	96.392
45	312	2020	155636623	125920499	93.068
46	312	2021	165962783	132444532	86.321
47	313	1999	54306000	6016000	68.126
48	313	2000	52112000	5214000	68.923
49	313	2001	45681000	4434567	71.802
50	313	2002	45549000	3977000	79.717
51	313	2003	42588000	3639000	89.477
52	313	2004	40898000	4416000	91.67
53	313	2005	42328000	7512000	99.985
54	313	2006	38829000	12377000	99.967
55	313	2007	36185000	14494000	102.295
56	313	2008	32052395	13186179	101.672
57	313	2009	26324000	12589000	102.512
58	313	2010	29331000	15505000	111.157
59	313	2011	30890000	14974000	110.309
60	313	2012	30328000	13899269	109.083
61	313	2013	31539469	16861000	113.557
62	313	2014	31308000	18329000	109.966

63	313	2015	29385000	18305000	98.942
64	313	2016	28129000	17831000	98.732
65	313	2017	27905332	19410715	100
66	313	2018	27811403	19480875	93.943
67	313	2019	26716050	19012622	89.703
68	313	2020	24308980	17508810	92.484
69	313	2021	26521078	18845974	90.624
70	314	1999	32689000	7284000	110.829
71	314	2000	33654000	5800000	117.794
72	314	2001	31971000	7409236	114.253
73	314	2002	31807000	7491000	116.539
74	314	2003	31261000	7244000	120.402
75	314	2004	33636000	8472000	134.739
76	314	2005	35022000	7189000	142.839
77	314	2006	33264000	11588000	132.052
78	314	2007	28881000	13470000	116.871
79	314	2008	26836336	11723062	114.029
80	314	2009	21366000	10019000	102.194
81	314	2010	20969000	9804000	113.324
82	314	2011	22368000	10805000	116.245
83	314	2012	22048000	11485046	111.227
84	314	2013	22889382	12710000	110.88
85	314	2014	25211000	14416000	122.222
86	314	2015	24855000	14527000	116.472
87	314	2016	24736000	14673000	109.085
88	314	2017	22983744	15260006	100
89	314	2018	22658822	15375740	102.512
90	314	2019	22699408	15106146	106.32
91	314	2020	21111610	14418764	108.77
92	314	2021	23698648	16062579	117.809
93	315	1999	62305000	16485000	165.229

94	315	2000	60339000	12063000	174.507
95	315	2001	54598000	10651670	170.047
96	315	2002	44515000	9726000	152.184
97	315	2003	38668000	9137000	161.11
98	315	2004	32873000	8694000	149.786
99	315	2005	31401000	8908000	153.836
100	315	2006	30325000	9182000	149.385
101	315	2007	24096000	7072000	104.032
102	315	2008	19139593	5938439	90.004
103	315	2009	13909000	5179000	83.829
104	315	2010	13366000	5159000	87.128
105	315	2011	12784000	5135000	88.465
106	315	2012	12739000	4977417	92.061
107	315	2013	12052793	4618000	95.355
108	315	2014	11466000	5993000	96.499
109	315	2015	10974000	5753000	93.645
110	315	2016	10513000	5939000	93.016
111	315	2017	10407833	5267532	100
112	315	2018	9740308	4995534	99.861
113	315	2019	10005413	5190273	105.87
114	315	2020	8360915	4299864	110.955
115	315	2021	9410887	4702878	122.311
116	316	1999	9653000	2336000	92.093
117	316	2000	9647000	2122000	96.103
118	316	2001	8834000	1438278	98.594
119	316	2002	6299000	783000	70.178
120	316	2003	5784000	653000	76.612
121	316	2004	5812000	611000	95.913
122	316	2005	6181000	826000	96.825
123	316	2006	5941000	926000	97.905
124	316	2007	5615000	1281000	93.84

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127	316	2010	4953000	1128000	102.62
128	316	2011	5665000	1405000	116.956
129	316	2012	5203000	1541722	88.097
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131	316	2014	5132000	1911000	101.5
132	316	2015	4991000	2204000	90.904
133	316	2016	4919000	2362000	97.632
134	316	2017	4808453	2282332	100
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138	316	2021	4745541	2557619	106.223
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140	321	2000	93669000	5957000	72.845
141	321	2001	87250000	4918910	73.915
142	321	2002	88985000	4567000	80.428
143	321	2003	92119000	5753000	81.785
144	321	2004	104135000	7974000	81.881
145	321	2005	112095000	12248000	85.333
146	321	2006	112403000	14960000	88.685
147	321	2007	102029000	19468000	90.034
148	321	2008	87764829	19375397	88.728
149	321	2009	65000000	16538000	89.07
150	321	2010	69566000	19712000	93.165
151	321	2011	70091000	21805000	93.71
152	321	2012	77913000	25997209	97.118
153	321	2013	88617589	35084000	97.594
154	321	2014	94924000	40379000	97.244
155	321	2015	97718000	43855000	99.424

156	321	2016	102047000	49828000	100.521
157	321	2017	107606458	52297128	100
158	321	2018	114213352	56598141	97.424
159	321	2019	106587047	55961842	90.608
160	321	2020	117840097	64048460	99.42
161	321	2021	154755774	83043622	95.488
162	322	1999	156915000	15312000	74.691
163	322	2000	165297000	20617000	77.553
164	322	2001	155846000	20208033	79.284
165	322	2002	153655000	18385000	86.523
166	322	2003	151094000	18683000	90.649
167	322	2004	155381000	19631000	94.326
168	322	2005	161928000	30579000	94.648
169	322	2006	169033000	40842000	95.693
170	322	2007	176108000	62644000	99.067
171	322	2008	179248789	67809552	97.656
172	322	2009	161636000	69312000	98.055
173	322	2010	170043000	78953000	97.971
174	322	2011	175552000	86897000	98.81
175	322	2012	181261000	98839003	104.54
176	322	2013	185895489	116715000	105.037
177	322	2014	186942000	126639000	102.656
178	322	2015	185321000	128197000	102.841
179	322	2016	181667000	128073000	101.169
180	322	2017	184587048	134911215	100
181	322	2018	191414905	145254738	98.087
182	322	2019	191790354	144744020	101.22
183	322	2020	181828683	142386435	99.953
184	322	2021	198257608	158155370	99.676
185	323	1999	101536000	7319000	106.78575
186	323	2000	104396000	5966000	108.53875

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187	323	2001	100792000	5885339	108.0945
188	323	2002	95388000	4725000	107.267875
189	323	2003	92663000	4452000	106.16925
190	323	2004	93595000	8259000	106.796875
191	323	2005	96922000	15592000	108.724625
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194	323	2008	98634118	29993267	109.28775
195	323	2009	82919000	26274000	103.751
196	323	2010	82410000	29105000	103.2965
197	323	2011	82380000	32659000	103.340875
198	323	2012	81979000	32440700	103.082625
199	323	2013	82425482	37014000	102.542375
200	323	2014	81629000	38364000	100.848625
201	323	2015	81049000	39643000	100.019125
202	323	2016	82693000	41941000	100.286
203	323	2017	80900790	36783673	100
204	323	2018	83310469	37974776	99.76775
205	323	2019	80977958	38148237	97.459125
206	323	2020	74220125	37806105	97.06625
207	323	2021	78051062	41084403	96.498625
208	324	1999	162620000	19881000	77.863875
209	324	2000	235134000	16647000	81.4695
210	324	2001	219075000	16312480	80.4935
211	324	2002	215190000	25523000	81.63725
212	324	2003	247316000	51586000	82.824625
213	324	2004	330439000	77527000	86.605125
214	324	2005	475787000	130869000	90.96775
215	324	2006	546811000	160177000	92.454875
216	324	2007	615548000	195309000	95.8695
217	324	2008	769698977	339210955	99.591375

218	324	2009	495777000	219546000	95.080625
219	324	2010	627092000	328817000	98.71725
220	324	2011	838083000	441837000	104.230625
221	324	2012	850621000	446067928	102.7925
222	324	2013	852802350	487594000	104.91875
223	324	2014	786274000	463379000	103.729875
224	324	2015	507785000	300559000	98.217375
225	324	2016	430329000	257085000	97.126625
226	324	2017	548122623	366788052	100
227	324	2018	672627047	446538107	102.327875
228	324	2019	599709876	407680501	99.922625
229	324	2020	357765819	239778889	90.698875
230	324	2021	610354904	406053512	98.4765
231	325	1999	420320000	58827000	81.101
232	325	2000	449159000	52974000	83.265
233	325	2001	438410000	54041000	82.505
234	325	2002	460451000	68674000	89.44
235	325	2003	486563000	85186000	92.353
236	325	2004	540883000	102967000	97.277
237	325	2005	610873000	173747000	103.411
238	325	2006	657082000	203168000	103.693
239	325	2007	724081000	252390000	113.715
240	325	2008	738668920	296058931	105.181
241	325	2009	624367000	263587000	97.648
242	325	2010	697812000	313317000	105.296
243	325	2011	773080000	365155000	105.005
244	325	2012	794709000	399589632	101.989
245	325	2013	785616462	426671000	104.247
246	325	2014	787436000	460879000	104.065
247	325	2015	737286000	432361000	102.56
248	325	2016	723271000	445218000	105.143

249	325	2017	756408618	506454033	100
250	325	2018	758063316	506903226	97.017
251	325	2019	731607225	497873082	93.335
252	325	2020	692249241	488209126	93.206
253	325	2021	832277161	590066853	96.318
254	326	1999	171885000	27795000	85.565
255	326	2000	178236000	28400000	88.018
256	326	2001	170717000	27324000	89.338
257	326	2002	173901000	23953000	97.532
258	326	2003	178328000	26954000	100.841
259	326	2004	184711000	33220000	103.259
260	326	2005	200304000	43123000	105.715
261	326	2006	211299000	48686000	104.912
262	326	2007	210377000	62188000	104.26
263	326	2008	203669157	72858370	98.569
264	326	2009	171115000	69935000	98.385
265	326	2010	188785000	82925000	102.531
266	326	2011	203757000	94519000	103.003
267	326	2012	218603000	107806744	105.747
268	326	2013	225763428	122231000	105.079
269	326	2014	234392000	134889000	103.442
270	326	2015	236525000	142196000	102.697
271	326	2016	235711000	144392000	102.781
272	326	2017	237455411	155086022	100
273	326	2018	251621105	167973523	101.669
274	326	2019	249263586	168605228	99.604
275	326	2020	234320215	164461644	98.925
276	326	2021	273326707	192646065	100.488
277	327	1999	96153000	7282000	93.144
278	327	2000	97329000	8174000	91.578
279	327	2001	94861000	7887025	89.137

280	327	2002	95265000	7144000	93.845
281	327	2003	96923000	8631000	100.261
282	327	2004	102880000	10850000	99.092
283	327	2005	114849000	16469000	105.34
284	327	2006	126263000	20726000	104.134
285	327	2007	128066000	23173000	105.279
286	327	2008	115455730	26620960	99.856
287	327	2009	89662000	24250000	94.053
288	327	2010	90104000	28053000	99.652
289	327	2011	92585000	30988000	100.77
290	327	2012	98464000	38167075	100.728
291	327	2013	106181751	45860000	103.519
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293	327	2015	118189000	54161000	102.022
294	327	2016	123230000	56925000	102.513
295	327	2017	127259464	57083315	100
296	327	2018	130152791	55907215	100.254
297	327	2019	133501626	59875320	100.168
298	327	2020	133238819	59889973	102.102
299	327	2021	144233010	66482655	106.772
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307	331	2006	234384000	59376000	84.726
308	331	2007	257277000	80850000	90.886
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316	331	2015	228434000	153866000	96.435
317	331	2016	206603000	143532000	101.419
318	331	2017	220957865	154616370	100
319	331	2018	253346894	182748757	96.943
320	331	2019	236437760	172545332	90.98
321	331	2020	202405222	151165517	93.263
322	331	2021	280820639	211201894	86.467
323	332	1999	257072000	29509000	89.672
324	332	2000	268212000	25798000	91.082
325	332	2001	253113000	24168254	90.933
326	332	2002	246734000	21427000	95.797
327	332	2003	245550000	23735000	98.816
328	332	2004	261101000	33992000	97.895
329	332	2005	289432000	50661000	101.025
330	332	2006	317214000	64109000	103.162
331	332	2007	345393000	84030000	105.736
332	332	2008	358257029	98341803	107.138
333	332	2009	280939000	89201000	99.38
334	332	2010	293889000	107911000	103.536
335	332	2011	323664000	125931000	104.729
336	332	2012	339775000	138360015	102.839
337	332	2013	347104973	161245000	101.499
338	332	2014	357478000	177055000	100.645
339	332	2015	349061000	180289000	98.409
340	332	2016	335756000	174473000	98.206
341	332	2017	344742838	187359890	100

		1	-		
342	332	2018	372868338	206570625	101.645
343	332	2019	375765333	213691212	99.887
344	332	2020	346384247	198814020	100.771
345	332	2021	393280185	225834419	103.665
346	333	1999	276901000	48452000	78.635
347	333	2000	291548000	40441000	83.402
348	333	2001	266553000	35670000	81.257
349	333	2002	253135000	30390000	87.686
350	333	2003	257375000	34797000	94.269
351	333	2004	272123000	52292000	95.597
352	333	2005	302650000	72390000	101.514
353	333	2006	326583000	93763000	104.694
354	333	2007	351531000	111074000	106.039
355	333	2008	355599582	129569057	104
356	333	2009	288006000	118721000	97.27
357	333	2010	317697000	150834000	106.856
358	333	2011	365010000	177872000	111.411
359	333	2012	407423000	217990855	115.265
360	333	2013	393531114	215920000	111.007
361	333	2014	403848000	249857000	109.131
362	333	2015	377547000	236733000	100.866
363	333	2016	348446000	220186000	97.057
364	333	2017	356613188	221805123	100
365	333	2018	390434595	247247828	102.624
366	333	2019	392780350	251794149	99.587
367	333	2020	354913916	233762985	96.504
368	333	2021	396517357	260362539	102.823
369	334	1999	467059000	65336000	44.319
370	334	2000	510639000	77933000	53.447
371	334	2001	429471000	73221000	54.241
372	334	2002	358258000	73406000	57.487

373	334	2003	352636000	67476000	66.459
374	334	2004	365545000	76197000	74.538
375	334	2005	372882000	113704000	79.689
376	334	2006	390813000	120947000	85.826
377	334	2007	403001000	142777000	93.637
378	334	2008	383914266	148576488	99.136
379	334	2009	320724000	134103000	93.598
380	334	2010	331330000	155903000	100.887
381	334	2011	338047000	169484000	106.127
382	334	2012	339358000	172745048	101.026
383	334	2013	308529756	153710000	101.243
384	334	2014	302049000	170665000	99.276
385	334	2015	299145000	179685000	98.447
386	334	2016	293587000	178895000	95.892
387	334	2017	310162157	193198856	100
388	334	2018	315840774	198590656	102.456
389	334	2019	317199679	205492845	99.527
390	334	2020	308479317	204721952	99.156
391	334	2021	324311209	217234008	105.495
392	335	1999	118313000	27067000	86.811
393	335	2000	125443000	30003000	91.648
394	335	2001	114067000	27845000	90.475
395	335	2002	104472000	23043000	92.886
396	335	2003	100140000	23722000	96.316
397	335	2004	105084000	25177000	102.513
398	335	2005	111977000	30602000	107.742
399	335	2006	119402000	34211000	108.659
400	335	2007	129737000	40737000	111.174
401	335	2008	130334430	44441585	107.628
402	335	2009	105417000	42354000	101.174
403	335	2010	110036000	49866000	107.154

404	335	2011	118500000	55544000	109.342
405	335	2012	123534000	64166161	107.804
406	335	2013	123513047	68096000	107.447
407	335	2014	126450000	74065000	110.205
408	335	2015	125435000	79404000	108.926
409	335	2016	124181000	79952000	104.867
410	335	2017	122359544	81132221	100
411	335	2018	129719356	87428245	101.419
412	335	2019	132199016	90925666	101.712
413	335	2020	128776232	92222350	104.932
414	335	2021	143285469	103215124	105.909
415	336	1999	676328000	268667000	68.473
416	336	2000	639861000	281396000	65
417	336	2001	602496000	264326000	67.172
418	336	2002	637675000	297280000	74.919
419	336	2003	661142000	327401000	80.299
420	336	2004	662001000	346473000	80.124
421	336	2005	690743000	381600000	83.624
422	336	2006	699034000	383560000	84.193
423	336	2007	744893000	411782000	91.592
424	336	2008	672783574	378463524	87.45
425	336	2009	539921000	318687000	83.87
426	336	2010	636825000	406408000	96.154
427	336	2011	691937000	422036000	97.907
428	336	2012	787705000	512939625	100.423
429	336	2013	841010082	640709000	101.972
430	336	2014	912177000	738255000	105.253
431	336	2015	949343000	781641000	105.253
432	336	2016	949275000	793902000	100.577
433	336	2017	961932881	778431501	100
434	336	2018	989981398	812654445	99.346

435	336	2019	937985929	751805673	95.321
436	336	2020	816856215	660400151	92.568
437	336	2021	878695342	706497970	92.336
438	337	1999	72659000	7623000	80.662
439	337	2000	75107000	8400000	81.023
440	337	2001	72147000	9347777	81.103
441	337	2002	77242000	8082000	87.905
442	337	2003	75423000	9983000	89.867
443	337	2004	78279000	11264000	92.202
444	337	2005	84181000	16233000	96.39
445	337	2006	85618000	18187000	99.121
446	337	2007	85534000	22483000	98.62
447	337	2008	79829115	24722025	102.147
448	337	2009	60287000	20685000	92.736
449	337	2010	59048000	23398000	98.033
450	337	2011	62285000	27006000	100.288
451	337	2012	66706000	29962371	103.55
452	337	2013	68218886	31031000	102.058
453	337	2014	69659000	35349000	98.456
454	337	2015	73946000	39740000	104.163
455	337	2016	74685000	40679000	102.354
456	337	2017	74469092	41785098	100
457	337	2018	77755883	43057449	99.126
458	337	2019	74857683	42960611	97.461
459	337	2020	70726289	43544977	96.819
460	337	2021	75706751	46098404	93.985
461	339	1999	108290000	13732000	79.27
462	339	2000	115280000	14800000	84.918
463	339	2001	116201000	15644129	85.601
464	339	2002	126951000	14068000	91.836
465	339	2003	129334000	14482000	97.546

483	339	2021	161242387	96050779	102.872
482	339	2020	143847977	85341375	96.774
481	339	2019	153195877	86725244	95.969
480	339	2018	153741167	84385069	102.046
479	339	2017	148413106	75876701	100
478	339	2016	155267000	76044000	104.547
477	339	2015	153210000	74428000	104.099
476	339	2014	151729000	69813000	106.467
475	339	2013	155888672	65833000	110.626
474	339	2012	149813000	58826026	106.567
473	339	2011	152514000	54028000	114.062
472	339	2010	149509000	48974000	116.423
471	339	2009	143749000	41495000	109.836
470	339	2008	153366655	38490619	109.601
469	339	2007	148377000	32821000	107.572
468	339	2006	150481000	28790000	107.991
467	339	2005	142770000	24251000	104.711
466	339	2004	131916000	17844000	97.226



