



Australian Government

Department of Infrastructure and Regional Development

Bureau of Infrastructure, Transport and Regional Economics



Modelled Road Construction and Maintenance Price Index

At a Glance

This Information Sheet presents estimates of the BITRE Road Construction and Maintenance Price (RCMP) index stretching back to 1910-11 and a model of its movements tied to the Australian diesel price, average weekly earnings and the capital expenditure to GDP ratio. Also included is a forecast to 2030.

In the period 1910-11 to 2015-16, the RCMPI increased from 1 to 96 (the index being set to 100 in 2011-12). But most of that was attributable to general inflation, as in the same time period the Australian Consumer Price Index increased from 2 to 108 (again with a 2011-12 base of 100). Deflating the road price index by the CPI gives a real RCMPI that from the 1950s is trendless, varying up and down in the range of 90 to 100.

This Information Sheet models these fluctuations as a function of the prices of energy and labour as well as investment activity, with the aim of being able to roughly forecast how the costs of road construction and maintenance would vary given different scenarios about future energy and labour prices.

The Road Construction and Maintenance Price Index

The BITRE road construction and maintenance price index (RCMPI) is an input-price index which has a number of applications. It is used as a deflator to convert nominal (current prices) road expenditure into real (constant price) values. It also provides a means for calculating real changes in road expenditures and government road funding levels (e.g. BITRE 2008, 2009).

In addition, it is used to measure the rate of change in the prices of goods and services, which are purchased by suppliers of road construction and maintenance services. It is intended to reflect trends in prices of major input components of road construction and maintenance.

The contribution of each input to the overall cost of road construction and maintenance work is determined by two factors: the unit price of the input and the input's per cent share in the total cost of road works.

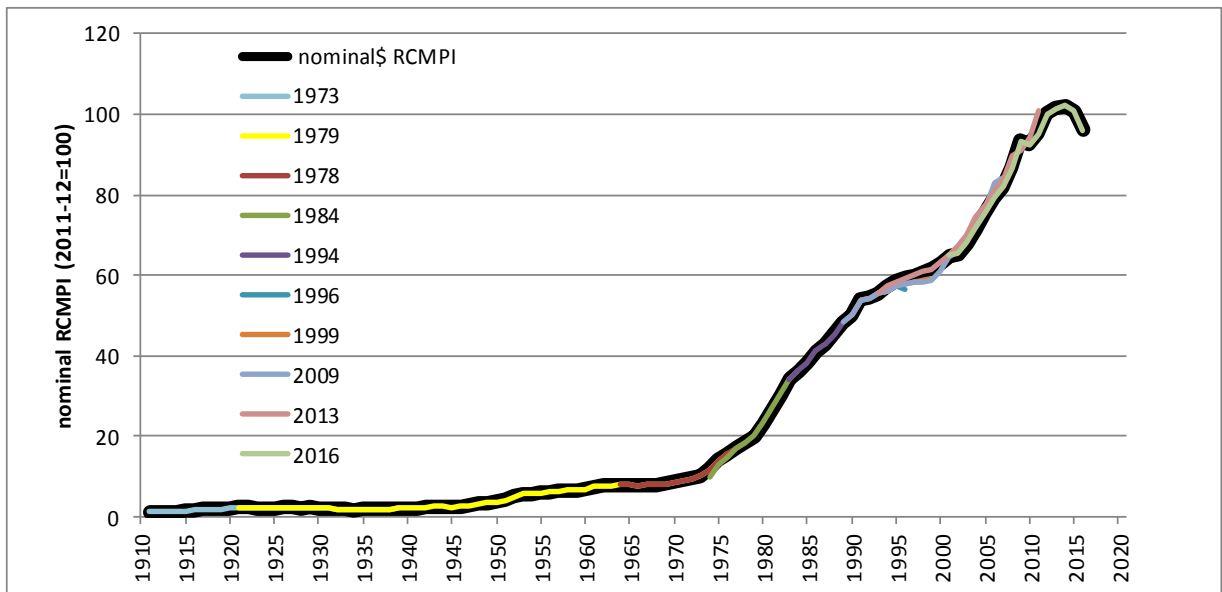
The index is currently composed of weighted series of prices of various components. These price series, with their weightings, are: Site-based labour 26.7%, Office-based labour 7.3%, Bituminous materials 13.7%, Cement and concrete 4.1%, Quarry products 13.4%, Other Materials (steel) 5.8%, Equipment hire/depreciation 23.2% and Fuel 5.8%.

BITRE (2016) presents the latest published update of the Road Construction and Maintenance Price (RCMP) index.

A composite series stretching back to 1910-11 can be pieced together from various sources. Figure 1 shows the different series and how they are combined into the composite RCMP index (based on financial years).

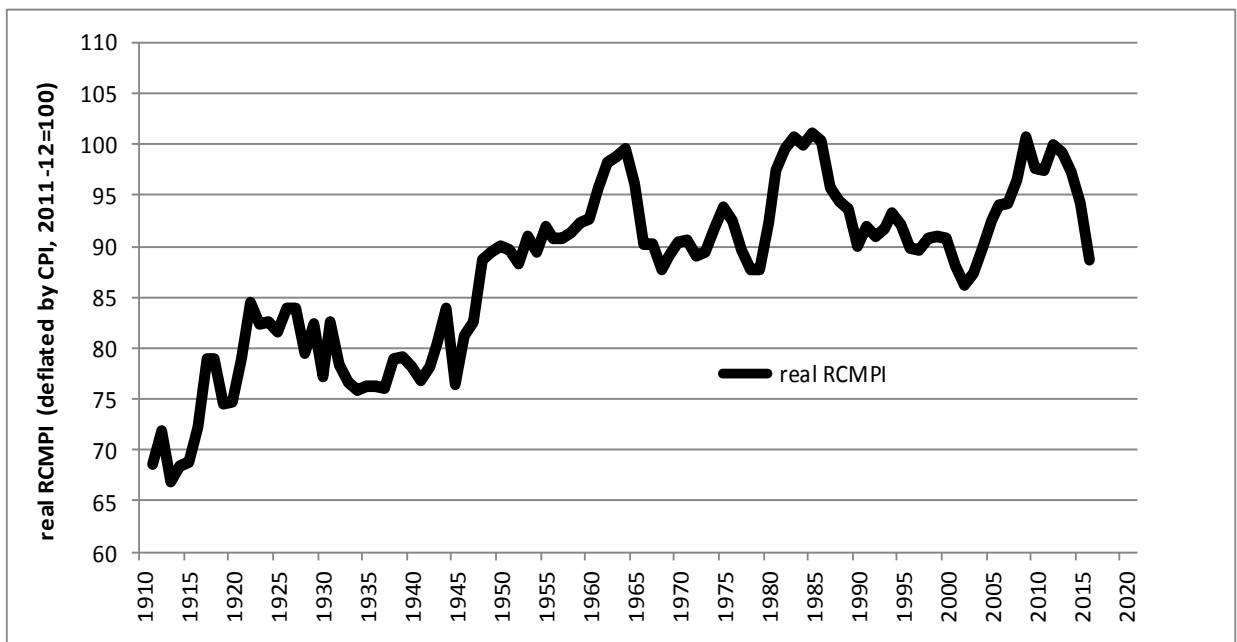
The year labels refer to sources of data given in the RCMP Indexes Reference section at the end of this publication.

Figure 1 The road construction and maintenance price index and component series



When the nominal dollar index of Figure 1 is divided by the Consumer Price Index, an RCMP real price index is derived. This is shown in Figure 2.

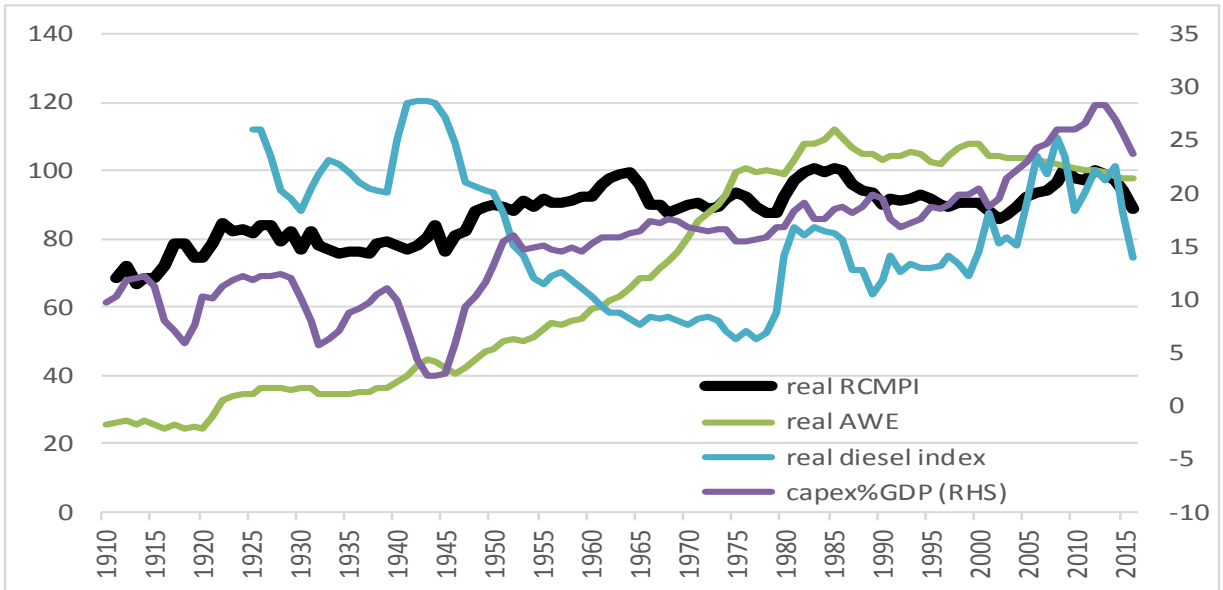
Figure 2 Road construction and maintenance real price index



The resulting RCMP real price index rises intermittently from 1901-11 to 1949-50 and then is trendless from the 1950s on, varying up and down in the range of 90 to 100.

The reason for this trend is a positive combination of two major underlying trend prices (those of diesel fuel and wages) and the positive effect of construction demand in the economy as a whole (measured by the capital expenditure to GDP ratio). Figure 3 shows the movement of the three series versus the RCMP. The three series have been pieced together from the four data sources given in the Other References section at the end of this publication.

Figure 3 Trends in real diesel prices, real wages and capex versus the real RCMP index

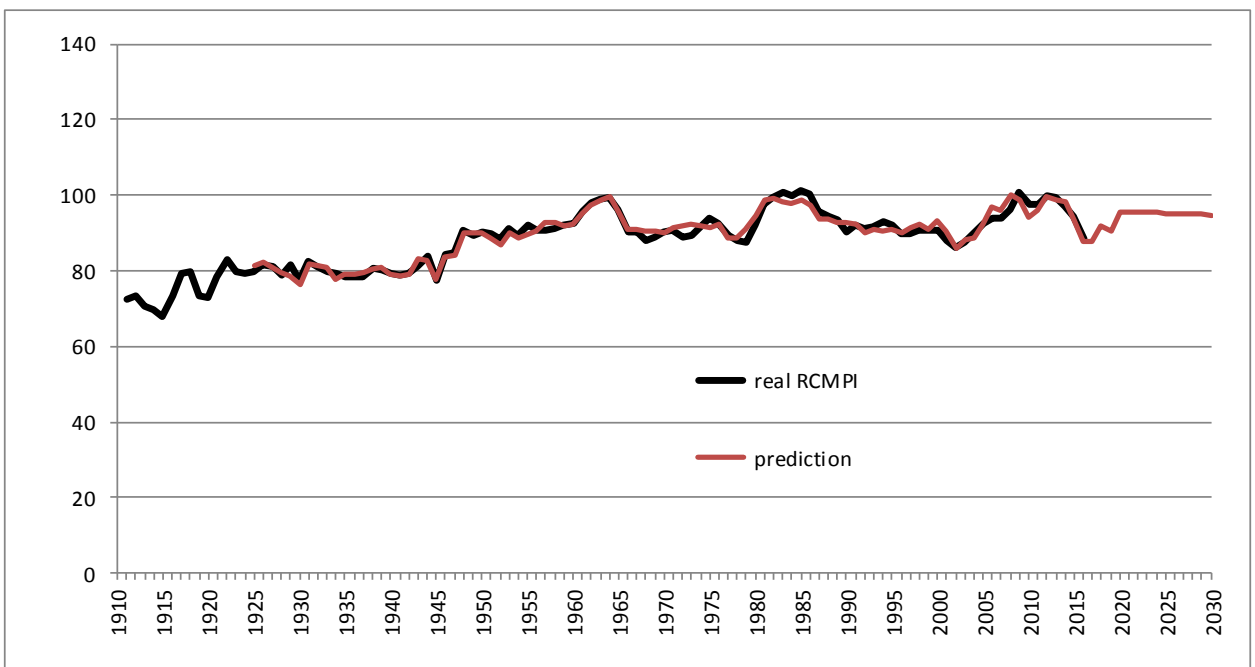


From 1925-26 (the first year diesel prices are estimated) to 1950, the diesel price and capex trends are flat (with fluctuations in one cancelling those of the other), while wages are rising. The result is an upward trend in the RCMP real price index. Then the RCMP index trend goes flat, as falling diesel prices balance an accelerated upward trend in wages to the mid-1970s. Thereafter, the RCMPI trend remains flat, as an upward trending but fluctuating diesel price adds to a slowly declining real wage trend. From 2004-05, diesel prices and capex have ceased cancelling each other, but rather both contributed to the boom and bust effect of the past decade.

Modelling the road construction and maintenance price index

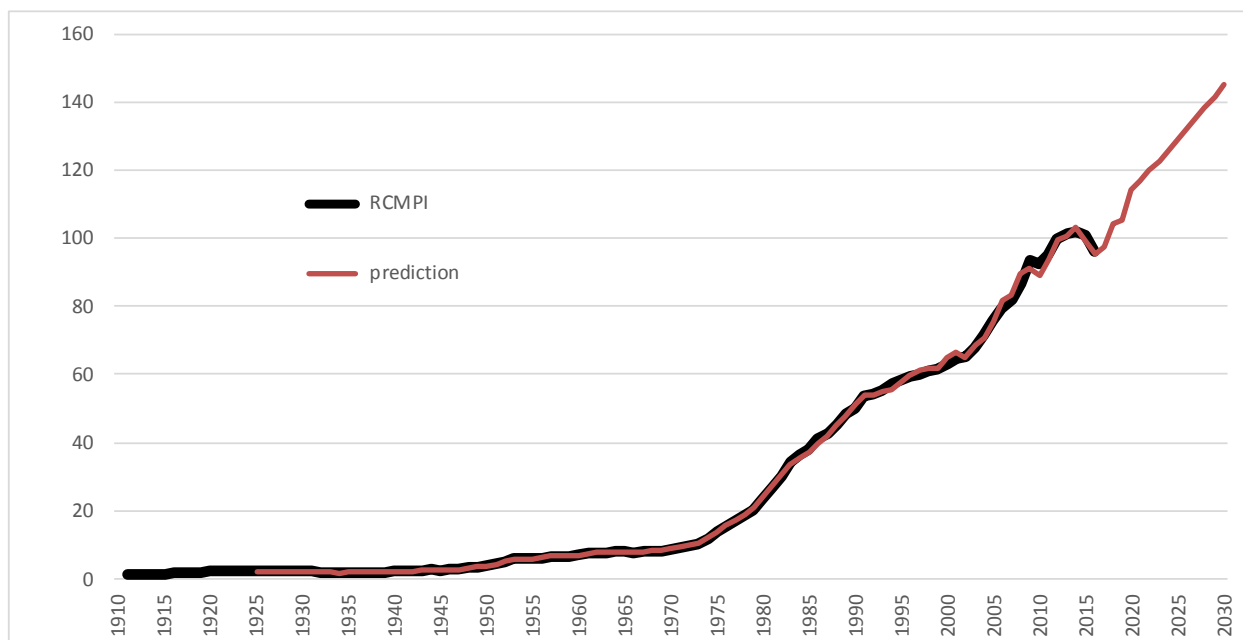
A model of the real RCMP index using real diesel prices, real Average Weekly Earnings and the capital expenditure to GDP ratio plus dummy variables, results in the predicted series shown in Figure 4. The forecast from 2016-17 is based on leaving real Average Weekly Earnings and the capex ratio constant, while projecting a recovery and then flattening of world oil prices (the basis for Australian diesel prices).

Figure 4 Real RCMP index and prediction/forecast



Translating into nominal terms, Figure 5 is the result (using a 2.5 per cent per year inflation assumption).

Figure 5 Nominal RCMP index and prediction/forecast



The fall in the *real* value of the index from 2012-13 to 2015-16, as shown in Figure 4, is not unprecedented. But combined with very low inflation, it produces the unprecedented two year fall in the *nominal* value of the index shown in Figure 5. The lower level of the index should last for another year (2016-17). An expected recovery in world oil prices would begin a period of substantial increases from 2017-18.

Conclusions

In the period 1910-11 to 2015-16, the Road Construction and Maintenance Price Index increased from 1 to 96 (the index being set to 100 in 2011-12).

But most of that was attributable to general inflation, as in the same time period the Australian Consumer Price Index increased from 2 to 108 (again with a 2011-12 base of 100).

Deflating the road price index by the CPI gives a real RCMP index that from the 1950s that is trendless, varying up and down in the range of 90 to 100.

The variation and what trend there is in the real RCMP index is well explained by two variables related to its components (real wages and diesel prices) and one relating to competing construction activity in the rest of the economy (the ratio of capital expenditure to GDP).

The outlook is for a period of faster growth in the index from 2017-18, followed by growth matching inflation in the 2020s.

RCMP Index References

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Table I: Data

Fin Year	nominal	nominal	nominal	nominal	chain-weighted 2016	chain-weighted 2016
	RCMPI	CPI	Diesel Price	Average Weekly Earnings	Capital Expenditure	GDP
	2011-12=100	2011-12=100	c/l	2011-12=100	\$m	\$m
1900		1.4		0.35	4443	47493
1901		1.5		0.35	4443	47493
1902		1.5		0.35	6039	52302
1903		1.5		0.36	5475	48880
1904		1.5		0.36	4338	54473
1905		1.5		0.36	4357	53554
1906		1.5		0.37	4586	55981
1907		1.5		0.38	5561	63866
1908		1.5		0.39	5571	58981
1909		1.6		0.41	5829	61273
1910		1.6		0.42	6278	64786
1911	1.2	1.6		0.45	7329	70636
1912	1.3	1.7		0.48	8237	69596
1913	1.3	1.8		0.50	9202	76531
1914	1.3	1.9		0.51	9488	77074
1915	1.4	2.0		0.52	7654	67922
1916	1.6	2.2		0.54	5991	75702
1917	1.8	2.3		0.58	5150	73380
1918	1.9	2.4		0.59	4262	72129
1919	2.0	2.7		0.66	5638	73772
1920	2.2	3.0		0.72	7195	69716
1921	2.4	3.0		0.84	8026	79230
1922	2.3	2.8		0.89	9326	83436
1923	2.2	2.7		0.90	10205	86241
1924	2.2	2.8		0.92	10979	89603
1925	2.2	2.7		0.93	11256	95453
1926	2.3	2.8	4.52	0.98	11246	92633
1927	2.3	2.8	4.21	0.98	11839	96553
1928	2.2	2.8	3.89	1.00	11915	95694
1929	2.3	2.8	3.80	1.00	11246	93855
1930	2.1	2.8	3.67	1.00	9603	95211
1931	2.1	2.6	3.62	0.93	6956	86241
1932	1.9	2.4	3.62	0.85	5036	87703
1933	1.8	2.3	3.62	0.82	5886	92965
1934	1.8	2.2	3.57	0.81	6727	96433
1935	1.8	2.3	3.48	0.82	8724	98589
1936	1.8	2.3	3.44	0.83	9555	103624
1937	1.9	2.4	3.48	0.86	10377	106972
1938	2.0	2.5	3.53	0.91	12001	113817
1939	2.0	2.5	3.57	0.94	12106	109263
1940	2.1	2.6	4.30	1.00	11523	115264
1941	2.1	2.7	4.98	1.10	9010	123903
1942	2.3	2.9	5.29	1.26	6192	142071
1943	2.5	3.1	5.61	1.38	4242	154449
1944	2.6	3.1	5.61	1.38	4434	152610
1945	2.4	3.1	5.48	1.35	4443	143790
1946	2.6	3.1	5.23	1.32	8151	137849
1947	2.7	3.2	4.77	1.39	12622	133673
1948	3.2	3.5	5.06	1.59	14810	144483
1949	3.4	3.9	5.39	1.80	17639	151615
1950	3.8	4.2	5.82	1.99	21566	163917
1951	4.2	4.7	6.18	2.37	26831	173371
1952	5.1	5.8	6.70	2.90	28656	178452
1953	5.7	6.3	7.04	3.16	25923	177065
1954	5.8	6.5	6.61	3.34	27968	188207
1955	6.0	6.5	6.52	3.51	30108	199424
1956	6.1	6.8	6.95	3.75	31035	209450
1957	6.5	7.1	7.48	3.92	31245	213566
1958	6.6	7.2	7.28	4.03	32698	218119
1959	6.7	7.3	7.12	4.14	34169	234312
1960	6.9	7.5	7.05	4.47	37695	246811
1961	7.5	7.8	6.98	4.68	40013	252989
1962	7.7	7.8	6.77	4.82	40751	256446
1963	7.7	7.8	6.81	4.95	43217	273137
1964	7.9	8.0	6.72	5.21	47252	290687

Table I: Data (cont'd)

Fin Year	nominal	nominal	nominal	nominal	chain-weighted 2016	chain-weighted 2016
	RCMPI	CPI	Diesel Price	Average Weekly Earnings	Capital Expenditure	GDP
	2011-12=100	2011-12=100	c/l	2011-12=100	\$m	\$m
1965	7.9	8.2	6.70	5.60	50946	308819
1966	7.7	8.5	7.23	5.86	55152	316540
1967	7.9	8.8	7.39	6.25	57763	335962
1968	7.9	9.1	7.71	6.62	61998	352879
1969	8.3	9.3	7.75	7.11	66030	378143
1970	8.6	9.6	7.78	7.71	68164	404593
1971	9.1	10.0	8.47	8.55	70718	422725
1972	9.5	10.7	9.09	9.42	72241	436489
1973	10.2	11.4	9.52	10.26	74549	449587
1974	11.8	12.8	10.18	11.92	77755	468180
1975	14.1	15.0	11.30	14.96	72896	472660
1976	15.6	16.9	13.32	17.10	75118	486757
1977	17.2	19.3	14.52	19.23	78570	503624
1978	18.5	21.1	16.49	21.12	81014	508458
1979	20.0	22.8	19.89	22.75	88994	528810
1980	23.2	25.2	28.07	24.98	92212	544878
1981	26.8	27.5	34.17	28.35	103312	563930
1982	30.3	30.4	36.72	32.82	110793	581271
1983	34.1	33.9	42.25	36.58	100682	569780
1984	36.2	36.2	44.28	39.63	104903	594425
1985	38.2	37.8	45.84	42.44	116303	626853
1986	41.1	40.9	48.70	44.96	122170	651849
1987	42.9	44.7	47.39	47.68	122276	669466
1988	45.3	48.0	50.59	50.56	132478	707384
1989	48.2	51.5	49.15	54.02	146888	735096
1990	50.1	55.7	56.24	57.59	147957	760800
1991	53.9	58.6	65.53	61.11	133785	758575
1992	54.4	59.7	62.74	62.44	128112	760851
1993	55.4	60.3	65.59	63.87	136332	791616
1994	57.3	61.4	65.25	64.37	145021	824616
1995	58.4	63.4	67.86	64.92	160269	856467
1996	59.4	66.1	70.88	67.58	164609	889551
1997	60.0	67.0	74.94	69.87	175847	924027
1998	60.8	67.0	72.85	71.61	193336	967087
1999	61.6	67.8	69.94	73.29	202311	1013980
2000	63.0	69.4	79.15	74.93	215176	1053168
2001	64.9	73.6	96.36	76.95	201760	1074350
2002	65.2	75.7	88.62	78.86	218209	1115006
2003	68.1	78.0	93.69	80.81	246067	1150410
2004	71.7	79.9	93.19	82.77	266877	1196876
2005	75.7	81.8	110.14	84.81	283668	1235987
2006	79.3	84.4	131.37	87.11	309526	1272430
2007	81.8	86.9	128.61	89.39	325161	1320051
2008	86.6	89.8	147.10	91.78	357330	1369606
2009	93.4	92.6	144.27	94.10	364303	1393658
2010	92.5	94.8	124.82	95.65	369669	1422803
2011	95.2	97.7	136.74	97.83	388052	1456495
2012	100.0	100.0	148.94	100.00	427841	1508738
2013	101.4	102.3	147.89	101.91	438168	1545784
2014	102.2	105.0	158.89	103.38	429471	1584463
2015	100.7	106.8	139.59	104.74	417048	1622063
2016	96.0	108.3	120.56	105.90	396871	1671022
2017		111.0	134.73	108.55	408016	1717950
2018		113.8	164.53	111.26	419798	1767555
2019		116.6	160.62	114.05	432048	1819134
2020		119.5	200.53	116.90	444679	1872315
2021		122.5	205.09	119.82	457474	1926192
2022		125.6	209.62	122.81	470522	1981128
2023		128.7	214.26	125.89	483825	2037143
2024		132.0	218.99	129.03	497306	2093903
2025		135.3	223.84	132.26	511058	2151807
2026		138.6	228.79	135.56	525165	2211202
2027		142.1	233.86	138.95	539629	2272105
2028		145.7	239.04	142.43	554495	2334697
2029		149.3	244.33	145.99	569768	2399001
2030		153.0	249.27	149.64	585451	2465035

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