

## Appendix A. Data description

This appendix lists the monthly observations of 219 Japanese macroeconomic time series from January 1973 to June 2018, which we used as our “big data” environment. In order to induce stationarity, most of the variables were transformed using the first difference of the log of seasonally adjusted series, with some exceptions. These exceptions include the level of the series itself and the year-on-year change of the original series. How we transform each data is annotated in the “Transformation”<sup>14</sup> column in the table below. In addition, forecast target variables are marked by \* in the “No.” column.

**Table A1**  
List of variables.

No.	Description	Transformation
<i>Real Output</i>		
1*	Index of Industrial Production (Mining and Manufacturing)	3
2	Index of Industrial Production (Manufacturing)	3
3	Index of Industrial Production (Mining)	3
4	Index of Industrial Production (Iron and Steel)	3
5	Index of Industrial Production (Non-Ferrous Metals)	3
6	Index of Industrial Production (Fabricated Metals)	3
7	Index of Industrial Production (General Machinery)	3
8	Index of Industrial Production (Electrical Machinery)	3
9	Index of Industrial Production (Transport Equipment)	3
10	Index of Industrial Production (Precision Instruments)	3
11	Index of Industrial Production (Ceramics Clay and Stone Products)	3
12	Index of Industrial Production (Chemicals)	3
13	Index of Industrial Production (Petroleum and Coal Products)	3
14	Index of Industrial Production (Plastic Products)	3
15	Index of Industrial Production (Pulp Paper and Paper Products)	3
16	Index of Industrial Production (Textiles)	3
17	Index of Industrial Production (Foods and Tobacco)	3
18	Index of Industrial Production (Other Manufacturing)	3
19	Index of Industrial Production (Final Demand Goods)	3
20	Index of Industrial Production (Producer Goods)	3
21	Index of Industrial Production (Producer Goods for Mining and Manufacturing)	3
22	Index of Industrial Production (Producer Goods for Others)	3
23	Index of Producer's Shipments (Final Demand Goods)	3
24	Index of Producer's Shipments (Producer Goods)	3
25	Index of Producer's Shipments (Producer Goods for Mining and Manufacturing)	3
26	Index of Producer's Shipments (Producer Goods for Others)	3
27*	Index of Capacity Utilization Ratio (Manufacturing)	3
28	Index of Capacity Utilization Ratio (Iron and Steel)	3
29	Index of Capacity Utilization Ratio (Non-Ferrous Metals)	3
30	Index of Capacity Utilization Ratio (Fabricated Metals)	3
31	Index of Capacity Utilization Ratio (General Machinery)	3
32	Index of Capacity Utilization Ratio (Electrical Machinery)	3
33	Index of Capacity Utilization Ratio (Transport Equipment)	3

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<sup>14</sup> Transformation 1: the level of the original or seasonally adjusted series; Transformation 2: the year-on-year change of the original series; Transformation 3: the first difference of the log of the seasonally adjusted series.

Table A1 (continued)

No.	Description	Transformation
34	Index of Capacity Utilization Ratio (Precision Instruments)	3
35	Index of Capacity Utilization Ratio (Ceramics, Clay and Stone Products)	3
36	Index of Capacity Utilization Ratio (Chemicals)	3
37	Index of Capacity Utilization Ratio (Petroleum and Coal Products)	3
38	Index of Capacity Utilization Ratio (Textiles)	3
39	Index of Capacity Utilization Ratio (Rubber Products)	3
40	Index of Capacity Utilization Ratio (Machinery)	3
41	Index of Tertiary Industry Activity (Total)	3
42	Index of Tertiary Industry Activity (Electricity Gas Heat and Water Supply)	3
43	Index of Tertiary Industry Activity (Transport and Communication)	3
44	Index of Tertiary Industry Activity (Transport)	3
45	Index of Tertiary Industry Activity (Wholesale Retail Trade Eating and Drinking Places)	3
46	Index of Tertiary Industry Activity (Eating and Drinking Places)	3
47	Index of Tertiary Industry Activity (Finance and Insurance)	3
48	Index of Tertiary Industry Activity (Real Estate)	3
49	Index of Tertiary Industry Activity (Services)	3
50	Index of Tertiary Industry Activity (Personal Services)	3
51	Index of Tertiary Industry Activity (Business Services)	3
<i>Inventories</i>		
52	Index of Producer's Inventory Ratio of Finished Goods (Mining and Manufacturing)	3
53	Index of Producer's Inventory Ratio of Finished Goods (Final Demand Goods)	3
54	Index of Producer's Inventory Ratio of Finished Goods (Investment Goods)	3
55	Index of Producer's Inventory Ratio of Finished Goods (Capital Goods)	3
56	Index of Producer's Inventory Ratio of Finished Goods (Construction Goods)	3
57	Index of Producer's Inventory Ratio of Finished Goods (Consumer Goods)	3
58	Index of Producer's Inventory Ratio of Finished Goods (Durable Consumer Goods)	3
59	Index of Producer's Inventory Ratio of Finished Goods (Non-Durable Consumer Goods)	3
60	Index of Producer's Inventory Ratio of Finished Goods (Producer Goods)	3
61	Index of Producer's Inventory Ratio of Finished Goods (Producer Goods for Mining and Manufacturing)	3
62	Index of Producer's Inventory Ratio of Finished Goods (Producer Goods for Others)	3
63	Index of Producer's Inventory of Finished Goods (Mining and Manufacturing)	3
64	Index of Producer's Inventory of Finished Goods (Final Demand Goods)	3
65	Index of Producer's Inventory of Finished Goods (Investment Goods)	3
66	Index of Producer's Inventory of Finished Goods (Capital Goods)	3
67	Index of Producer's Inventory of Finished Goods (Construction Goods)	3
68	Index of Producer's Inventory of Finished Goods (Consumer Goods)	3
69	Index of Producer's Inventory of Finished Goods (Durable Consumer Goods)	3
70	Index of Producer's Inventory of Finished Goods (Non-Durable Consumer Goods)	3
71	Index of Producer's Inventory of Finished Goods (Producer Goods)	3
72	Index of Producer's Inventory of Finished Goods (Producer Goods for Mining and Manufacturing)	3
73	Index of Producer's Inventory of Finished Goods (Producer Goods for Others)	3

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Table A1 (continued)

No.	Description	Transformation
<i>Investments</i>		
74	Index of Producer's Shipments (Investment Goods Excluding Transport Equipments)	3
75	Index of Producer's Shipments (Producer Goods)	3
76	Index of Industrial Production (Investment Goods)	3
77	Index of Industrial Production (Capital Goods)	3
78	Index of Industrial Production (Construction Goods)	3
79	Index of Production Capacity (Manufacturing)	3
80	Machinery Orders (Total Excluding Ships)	3
81	Machinery Orders (Private Sector Excluding Volatile Orders)	3
82	Machinery Orders (Manufacturing)	3
83	Machinery Orders (Non-Manufacturing Excluding Volatile Orders)	3
84	Machinery Orders (Government)	3
85	Order Received for Construction (Grand Total)	3
86	Order Received for Construction (Private)	3
87	Order Received for Construction (Public)	3
88	Total Floor Area of Building Construction Started (Grand Total)	3
89	Total Floor Area of Building Construction Started (Mining Manufacturing and Commercial Use)	3
90	Total Floor Area of Building Construction Started (Mining)	3
91	Total Number of New Housing Construction Started (Total)	3
92	Total Number of New Housing Construction Started (Owned)	3
93	Total Number of New Housing Construction Started (Rented)	3
94	Total Number of New Housing Construction Started (Built for Sale)	3
95	Total Number of New Housing Construction Started (Government Housing Loan Corporation)	3
96	Total Floor Area of New Housing Construction Started (Total)	3
97	Total Floor Area of New Housing Construction Started (Owned)	3
98	Total Floor Area of New Housing Construction Started (Rented)	3
99	Total Floor Area of New Housing Construction Started (Built for Sale)	3
<i>Employment</i>		
100	Index of Non-Scheduled Worked Hours (All Industries - 30 or more persons)	3
101	Index of Non-Scheduled Worked Hours (Manufacturing)	3
102	Index of Total Worked Hours (All Industries - 30 or more persons)	3
103	Index of Total Worked Hours (Manufacturing)	3
104	Ratio of Non-Scheduled to Total Worked Hours (All Industries -30 or more persons)	3
105	Ratio of Non-Scheduled to Total Worked Hours (Manufacturing)	3
106	New Job Offers	3
107	Effective Job Offers	3
108	New Job Offer Rate	3
109	Effective Job Offer Rate	3
110	New Job Offers (Part-time)	3
111	Effective Job Offers (Part-time)	3
112	New Job Offer Rate (Part-time)	3
113	Effective Job Offer Rate (Parttime)	3
114	Index of Regular Workers Employment (All Industries - 30 or more persons)	3
115	Index of Regular Workers Employment (All Industries Excluding Services)	3
116	Index of Regular Workers Employment (Mining)	3
117	Index of Regular Workers Employment (Construction)	3
118	Index of Regular Workers Employment (Manufacturing)	3
119	Index of Regular Workers Employment (Electricity Gas and Heat Supply)	3
120	Index of Regular Workers Employment (Transport and Communication)	3
121	Index of Regular Workers Employment (Wholesale and Retail Trade)	3

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Table A1 (continued)

No.	Description	Transformation
122	Index of Regular Workers Employment (Finance and Insurance)	3
123	Index of Regular Workers Employment (Real Estate)	3
124	Index of Regular Workers Employment (Services)	3
125	Number of Unemployment	3
126*	Unemployment Rate	1
127	Number of Beneficiaries of Unemployment Insurance (Initial Claimants)	2
128	Number of Beneficiaries of Unemployment Insurance (Total)	2
129	Number of Persons with Unemployment Insurance	2
130*	Real Wage Index (Contractual Cash Earnings in All Industries - 30 or more persons)	3
<i>Consumption</i>		
131	Sales at Department Stores (Total)	2
132	Sales at Department Stores (Per Square Meter Floor Space)	2
133	Index of Sales (Total)	2
134	Index of Sales (Wholesale)	2
135	Index of Sales (Retail)	2
136	Number of New Passenger Car Registrations and Reports (Total)	3
137	Number of New Passenger Car Registrations and Reports (Excluding Cars under 550cc)	3
138*	Household Consumption Expenditure (Workers)	3
139	Household Consumption Expenditure (Food)	3
140	Household Disposable Income (Workers)	3
141	Index of Industrial Production (Consumer Goods)	3
142	Index of Industrial Production (Durable Consumer Goods)	3
143	Index of Industrial Production (Non-Durable Consumer Goods)	3
144	Index of Producer's Shipments (Consumer Goods)	3
145	Index of Producer's Shipments (Durable Consumer Goods)	3
146	Index of Producer's Shipments (Non-Durable Consumer Goods)	3
<i>Firms</i>		
147	Index of Investment Climate (Manufacturing)	3
148	Corporation Tax Revenue	3
149	Suspension of Business Transaction with Bank	3
<i>Money, Stock Price and Interest Rate</i>		
150	Money Stock (M2 + CD, Average Outstanding)	2
151	Money Stock (M1, Average Outstanding)	2
152	Monetary Base (Average Outstanding)	2
153	Bank Notes Issued (Average Outstanding)	2
154	Bank Clearings (Number)	3
155	Bank Clearings (Value)	3
156	Nikkei Stock Average 225 Selected Stocks (Average of Month)	3
157	Nikkei Stock Average 500 Selected Stocks	3
158	Stock Price Index (TOPIX)	3
159	Stock Price Average (Tokyo Stock Market First Section)	3
160	Stock Price Index (Fisheries, Agriculture and Forestry)	3
161	Stock Price Index (Mining)	3
162	Stock Price Index (Construction)	3
163	Stock Price Index (Foods)	3
164	Stock Price Index (Textiles)	3
165	Stock Price Index (Pulp and Paper)	3
166	Stock Price Index (Oil and Coal Products)	3
167	Stock Price Index (Rubber Products)	3
168	Stock Price Index (Glass and Ceramics Products)	3
169	Stock Price Index (Iron and Steel)	3
170	Stock Price Index (Non-Ferrous Metals)	3
171	Stock Price Index (Metal Products)	3
172	Stock Price Index (Machinery)	3
173	Stock Price Index (Electrical Machinery)	3
174	Stock Price Index (Transportation Equipment)	3
175	Stock Price Index (Precision Equipment)	3
176	Stock Price Index (Other Products)	3
177	Stock Price Index (Electric and Gas)	3
178	Stock Price Index (Land Transportation)	3
179	Stock Price Index (Marine Transportation)	3
180	Stock Price Index (Air Transportation)	3
181	Stock Price Index (Warehouse and Transport Related)	3

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Table A1 (continued)

No.	Description	Transformation
182	Stock Price Index (Communication)	3
183	Stock Price Index (Real Estate)	3
184	Stock Price Index (Service)	3
185	Sales Volume (Daily Average Tokyo Stock Market First Section)	3
186	Sales Value (Daily Average Tokyo Stock Market First Section)	3
187	Official Discount Rates	1
188	Short-Term Prime Lending Rates	1
189	Long-Term Prime Lending Rates	1
190	Average Contracted Interest Rate on Loans and Discounts (Domestically Licensed Bank)	1
191	Yields on Interest Bearing Government Bonds (10 years)	1
<i>Price Indexes</i>		
192	Nikkei Commodity Price Index (17 items)	2
193	Nikkei Commodity Price Index (42 items)	2
194*	Wholesale Price Index (All Commodities)	2
195	Wholesale Price Index (Manufacturing Industry Products)	2
196	Wholesale Price Index (Raw Materials)	2
197	Wholesale Price Index (Intermediate Materials)	2
198	Wholesale Price Index (Final Goods)	2
199	Wholesale Price Index (Capital Goods)	2
200	Wholesale Price Index (Consumer Goods)	2
201	Wholesale Price Index (Durable Consumer Goods)	2
202	Wholesale Price Index (Non-Durable Consumer Goods)	2
203	Consumer Price Index (General)	2
204*	Consumer Price Index (General Excluding Fresh Food)	2
205	Consumer Price Index (General Excluding Fresh Food and Imputed Rent)	2
206	Consumer Price Index (Food)	2
207	Consumer Price Index (Housing)	2
208	Consumer Price Index (Fuel Light and Water Charges)	2
209	Consumer Price Index (Furniture and Household Utilities)	2
210	Consumer Price Index (Clothes and Footware)	2
211	Consumer Price Index (Medical Care)	2
212	Consumer Price Index (Transportation and Communication)	2
213	Consumer Price Index (Reading and Recreation)	2
214	Consumer Price Index (Miscellaneous)	2
<i>Trade</i>		
215	Terms of Trade Index (All Commodities)	3
216	Quantum Index of Exports (Total)	3
217	Quantum Index of Imports (Total)	3
218	Customs Clearance (Value of Exports, Grand Total)	3
219	Foreign Exchange Rate (Yen per US Dollar, Spot)	3