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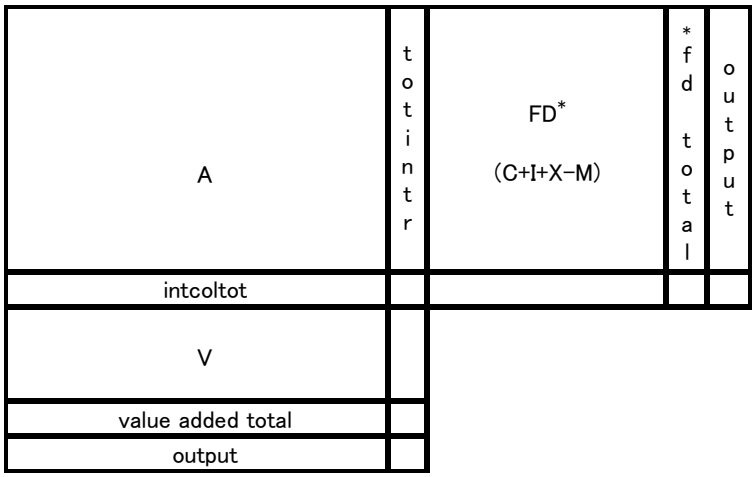
Some useful techniques and questions captured through the improvements of JIDEA model

JIDEA team Japan

We have started building our model since 1993. Mr. Sasai had struggled with the model and accumulated experience and expertise in the model through trial and errors. This paper aims at showing some of useful findings in model building/operation so that people can avoid trouble.

1. The biggest problem that we had was conversion.
   Our early models were hard to converge. Even if it converged, the result was not consistent.
   This meant that the sum of final demand total in nominal term was not equal to that of value added total. The sum of intermediates total and final demand total did not coincide with output total in real term, and so forth.



   Regarding this problem, two factors were contributed a lot; 1) applying the not suitable price model and 2) program errors.

   1) Error in the specification of price deflators

   It was only 2008 that we knew that there were several price models. We had been using the original price model since 1993.

   p' = p'AD + pm'AM + v

Typically, p is domestic output price; AD is the domestic requirements matrix, adjusted by the ratio of imports to domestic demand;
pm is the import deflator;
AM is the imported part of intermediate demand;
and v is unit value added.

In our model, we have four deflators; pdo, pex, pim and pdd.
Pdo is price deflator of output;
Pex is price deflator of export;
Pim is price deflator of import,
And pdd is price deflator of domestic price.
Pdd is derived by the following equation;
Pdd $_i$=(output $_i$ -export $_i$ +import $_i$) /(output $_i$ /pdo $_i$ -export $_i$ /pex $_i$ +import $_i$ /pim $_i$)

The first three deflators are officially announced and pdd is calculated by using these variables.

Dr. Douglas Meade assisted us greatly to solve this problem by showing us his papers[1].

We changed the price model below;
p' = pw'A + v'
p is domestic price, pw is the weighted price, v is unit value added.

Followings is an excerpts of the paper;

PSeidel with Import Prices, and Export Prices

$$pd_i q_i = \sum_{j=1}^{n} pw_i a_{ij} q_j + pw_i o_i - pm_i m_i + px_i x_i$$

PSeidel with Import Prices, but no Import Matrix

$$pd_i q_i = \sum_{j=1}^{n} pw_i a_{ij} q_j + pw_i o_i - pm_i m_i$$

2) Program error

[1] Douglas S. Meade, The Inforum PSeidel Routine, October 1, 2009

In the Price Seidel, a subroutine program related to the price, we made mistake in the correspondence of variables used in the main program.
This led to ta wrong solution though the model converged and showed results.

2. To check the balance

We have developed an excel program to check the balance of the model solution using vba and interface of G7.
We owe very much to Dr. Ron Horst, who provided us with the interface program.
Though the speed to transfer the data of vam bank to excel is very slow, it is of great use because we can see the whole data in one glance.
Especially this enables us to check easier if the converged solutions are well balanced and if trend functions do not plunge into negative.

Following the sample of the interface program;

```
vam base a
dvam a
tdates 2005 2020
fdates 2005 2020

xl open c:¥jidea7¥baseline.xls     # Open the spreadsheet

xl open worksheet 1                # Open the first worksheet
do{
f  no%1=%1
xl write A %1 "%1"
xl write C %1 right totintr%1 2005 2020
xl write AA %1 "%1"
xl write AC %1 right totint%1 2005 2020
} (1-66)
xl write  C 68 "totintr"
xl write  AC 68 "totint"

xl open worksheet 2
do{
f  no%1=%1
xl write A %1 "%1"
xl write C %1 right cohr%1 2005 2020
xl write aa %1 "%1"
xl write ac %1 right coh%1 2005 2020
} (1-66)
xl write C 68  "cohr"
xl write ac 68 "coh"
xl write C 69 right totcohr 2005 2020
xl write ac 69 right totcoh 2005 2020
xl  write A 71  "disincr"
xl  write c 71  right  disincr 2005 2020
xl  write A 72  "pop"
xl  write c 72  right  pop  2005 2020
        .
        .
xl open worksheet 24
do{
f  no%1=%1
xl write A %1 "%1"
} (1-66)
do{
xl write C %1 right pdd%1 2005 2020
} (1-66)
xl write C 68  "pdd"

xl     exit
xl   close()
```

3. The conversion threshold

   In seeking for the strictness of converged figure, we increased the judging variables and its criteria.

   Initially we use only the total of real gdp for conversion judgement and its threshold was 0.001.

   However, we increased the number of variables and threshold for the conversion check to 16 variables and 0.0008 respectively as shown below ;

```
converge = fabs((initkgdp-gdpr[t])/initkgdp);
converge1 = fabs((initk1-totcohr[t])/initk1);
converge2 = fabs((initk2-totiprr[t])/initk2);
converge3 = fabs((initk3-totexpr[t])/initk3);
converge4 = fabs((initk4-totimpr[t])/initk4);
converge5 =   fabs((initk5-totoutr[t])/initk5);
converge6 = fabs((initk6-totwag[t])/initk6);
converge7 = fabs((initk7-totpro[t])/initk7);
converge8 = fabs((initk8-tottax[t])/initk8);
converge9 = fabs((initk9-totdep[t])/initk9);
converge10 = fabs((initk10-tototh[t])/initk10);
converge11 = fabs((initk11-totsub[t])/initk11);
converge12 = fabs((initk12-totout[t])/initk12);
converge13 = fabs((initk13-totva[t])/initk13);
converge14 = fabs((initk14-gdpn[t])/initk14);
converge15 = fabs((initk15-ddtotdfl[t])/initk15).
```

The more we increase the variables for judgment and their threshold levels, the more we may reach an optimum solution, we assume.

However, the outstanding difference cannot be observed. This may be because the model calculates at single precision, therefore we can not distinguish the results so much.

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Judged by only GDPr at 0.0008

Yr	M	Q	P	GDPR	Cons	Inv	Exp	Imp	Outr	Wage/E	Infl	Emp	GrGDPr
6	3			522.3	382.0	135.1	80.7	75.5	968.1	4.239	0.07	63820	1.04
7	8	3		534.9	387.0	137.2	87.5	76.7	995.3	4.270	0.27	65171	2.42
8	8	3		524.8	379.3	132.1	89.0	75.6	977.1	4.276	-0.35	63801	-1.89
9	8	3		508.8	368.8	127.7	86.7	74.3	947.9	4.271	-0.59	61740	-3.05
10	8	3		504.2	365.4	125.8	87.6	74.6	940.2	4.283	-0.33	60975	-0.90
11	3	4		498.7	359.0	126.3	88.0	74.6	931.3	4.305	-0.05	60189	-1.09
12	8	3		508.7	368.5	128.2	88.6	76.6	948.4	4.324	0.06	61043	2.00
13	7	3		514.9	373.5	130.3	89.2	78.1	959.2	4.367	0.46	61496	1.21
14	7	3		519.3	376.8	130.9	91.1	79.5	967.4	4.423	0.66	61730	0.86
15	7	3		523.6	380.0	131.6	93.1	81.0	975.6	4.464	0.38	61948	0.83
16	7	3		528.3	384.4	132.3	94.3	82.7	983.9	4.516	0.72	62220	0.90
17	7	3		532.9	387.8	133.2	96.1	84.1	992.4	4.554	0.37	62469	0.88
18	7	3		537.8	391.4	134.0	98.0	85.6	1001.3	4.602	0.50	62737	0.91
19	7	3		542.8	395.1	134.9	99.9	87.1	1010.5	4.652	0.52	63008	0.93
20	7	3		547.9	399.3	135.4	101.8	88.6	1019.7	4.709	0.64	63289	0.95

Total execution time: 9 seconds

		1	2	3	4	5	6	7	8
	iter	Gdpr	Cohr	Iprr	Expr	Impr	Outr	Wag	Pro
2006	3	0	0	0	0	0	0	0	0
2007	8	0.00031	0.00023	0.00001	0.00009	0.00041	0.00033	0.00056	0.00166
2008	8	0.00060	0.00079	0.00001	0.00019	0.00016	0.00058	0.00055	0.00054
2009	8	0.00078	0.00109	0.00001	0.00023	0.00014	0.00073	0.00071	0.00028
2010	8	0.00056	0.00072	0.00001	0.00014	0.00025	0.00053	0.00062	0.00090
2011	3	0.00009	0.01682	0.01406	0.00001	0.01407	0.00032	0.01950	0.01738
2012	8	0.00022	0.00016	0.00001	0.00005	0.00034	0.00023	0.00039	0.00165
2013	7	0.00068	0.00052	0.00002	0.00015	0.00055	0.00060	0.00129	0.00242
2014	7	0.00052	0.00032	0.00002	0.00010	0.00049	0.00046	0.00114	0.00221
2015	7	0.00059	0.00043	0.00002	0.00012	0.00046	0.00053	0.00119	0.00205
2016	7	0.00044	0.00021	0.00001	0.00007	0.00044	0.00038	0.00108	0.00207
2017	7	0.00061	0.00043	0.00002	0.00012	0.00044	0.00053	0.00122	0.00197
2018	7	0.00055	0.00035	0.00002	0.00010	0.00044	0.00048	0.00120	0.00200
2019	7	0.00054	0.00033	0.00001	0.00009	0.00043	0.00047	0.00120	0.00198
2020	7	0.00048	0.00025	0.00001	0.00008	0.00042	0.00042	0.00118	0.00197
		9	10	11	12	13	14	15	16
	iter	Tax	Dep	Oth	Sub	Out	Va	Gdpn	Pdd
2006	iter	0	0	0	0	0	0	0	0
2007	3	0.00045	0.00078	0.00107	0.00064	0.00085	0.00082	0.00081	0.00052
2008	8	0.00007	0.00060	0.00030	0.00016	0.00028	0.00051	0.00035	0.00028
2009	8	0.00005	0.00067	0.00014	0.00005	0.00019	0.00055	0.00033	0.00051
2010	8	0.00025	0.00074	0.00055	0.00026	0.00048	0.00066	0.00055	0.00003
2011	8	0.00825	0.01589	0.04146	0.00505	0.00022	0.01018	0.00111	0.00076
2012	3	0.00037	0.00072	0.00100	0.00048	0.00077	0.00070	0.00072	0.00054
2013	8	0.00072	0.00156	0.00204	0.00100	0.00134	0.00153	0.00138	0.00076
2014	7	0.00067	0.00139	0.00193	0.00092	0.00124	0.00138	0.00126	0.00079
2015	7	0.00060	0.00140	0.00185	0.00088	0.00118	0.00136	0.00121	0.00066
2016	7	0.00061	0.00129	0.00188	0.00086	0.00117	0.00129	0.00118	0.00080
2017	7	0.00057	0.00137	0.00184	0.00084	0.00114	0.00136	0.00118	0.00062
2018	7	0.00056	0.00136	0.00188	0.00085	0.00116	0.00135	0.00119	0.00069
2019	7	0.00055	0.00135	0.00189	0.00083	0.00116	0.00135	0.00119	0.00070
2020	7	0.00055	0.00132	0.00192	0.00083	0.00116	0.00133	0.00118	0.00075

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Judged by only GDPr and totcohr at 0.0008

Yr	M	Q	P	GDPR	Cons	Inv	Exp	Imp	Outr	Wage/E	Infl	Emp	GrGDPr
6	3			522.3	382.0	135.1	80.7	75.5	968.1	4.239	0.07	63820	1.04
7	8	3		534.9	387.0	137.2	87.5	76.7	995.3	4.270	0.27	65171	2.42
8	8	3		524.8	379.3	132.1	89.0	75.6	977.1	4.276	-0.35	63801	-1.89
9	9	3		509.1	369.1	127.7	86.7	74.3	948.4	4.272	-0.62	61769	-3.00
10	8	3		504.3	365.5	125.8	87.6	74.6	940.3	4.283	-0.30	60981	-0.94
11	8	3		505.8	366.7	126.4	88.2	75.5	943.1	4.300	-0.12	60931	0.30
12	8	3		510.2	369.7	128.6	88.6	76.8	951.0	4.324	0.15	61206	0.86
13	7	3		514.8	373.5	130.3	89.2	78.1	959.1	4.367	0.46	61494	0.91
14	7	3		518.9	376.6	130.8	91.1	79.5	966.8	4.423	0.65	61693	0.80
15	7	3		523.0	379.5	131.3	93.1	81.0	974.5	4.463	0.37	61881	0.78
16	7	3		528.1	384.2	132.3	94.3	82.6	983.4	4.515	0.72	62193	0.97
17	7	3		533.0	387.8	133.2	96.1	84.1	992.6	4.554	0.38	62479	0.94
18	7	3		538.0	391.5	134.1	98.0	85.6	1001.7	4.602	0.51	62759	0.93
19	7	3		542.9	395.2	134.9	99.9	87.1	1010.7	4.652	0.52	63022	0.91
20	7	3		547.9	399.3	135.4	101.8	88.6	1019.6	4.709	0.64	63287	0.92

Total execution time: 9 seconds

	iter	Gdpr	Cohr	Iprr	Expr	Impr	Outr	Wag	Pro
2006	8	0	0	0	0	0	0	0	0
2007	8	0.00031	0.00023	0.00001	0.00009	0.00041	0.00033	0.00056	0.00166
2008	9	0.00060	0.00079	0.00001	0.00019	0.00016	0.00058	0.00055	0.00054
2009	8	0.00054	0.00070	0.00001	0.00018	0.00011	0.00052	0.00060	0.00023
2010	8	0.00055	0.00070	0.00001	0.00014	0.00024	0.00052	0.00061	0.00089
2011	8	0.00041	0.00047	0.00001	0.00011	0.00030	0.00040	0.00054	0.00132
2012	7	0.00029	0.00028	0.00001	0.00005	0.00033	0.00028	0.00041	0.00152
2013	7	0.00066	0.00052	0.00002	0.00014	0.00051	0.00059	0.00126	0.00223
2014	7	0.00053	0.00034	0.00002	0.00010	0.00048	0.00046	0.00114	0.00217
2015	7	0.00061	0.00045	0.00002	0.00012	0.00045	0.00054	0.00119	0.00199
2016	7	0.00045	0.00022	0.00002	0.00007	0.00044	0.00038	0.00109	0.00211
2017	7	0.00061	0.00043	0.00002	0.00012	0.00045	0.00053	0.00122	0.00200
2018	7	0.00055	0.00035	0.00002	0.00010	0.00044	0.00048	0.00120	0.00201
2019	7	0.00054	0.00033	0.00001	0.00009	0.00043	0.00047	0.00120	0.00197
2020	0	0.00049	0.00025	0.00001	0.00008	0.00041	0.00042	0.00118	0.00196
	iter	Tax	Dep	Oth	Sub	Out	Va	Gdpn	Pdd
2006	0	0	0	0	0	0	0	0	0
2007	iter	0.00045	0.00078	0.00107	0.00064	0.00085	0.00082	0.00081	0.00052
2008	8	0.00007	0.00060	0.00030	0.00016	0.00028	0.00051	0.00035	0.00028
2009	8	0.00003	0.00046	0.00019	0.00012	0.00016	0.00044	0.00025	0.00034
2010	9	0.00025	0.00073	0.00055	0.00026	0.00047	0.00065	0.00054	0.00003
2011	8	0.00034	0.00078	0.00082	0.00039	0.00065	0.00072	0.00066	0.00026
2012	8	0.00036	0.00075	0.00091	0.00042	0.00072	0.00069	0.00068	0.00044
2013	8	0.00068	0.00148	0.00192	0.00095	0.00126	0.00146	0.00130	0.00068
2014	7	0.00066	0.00138	0.00190	0.00091	0.00122	0.00137	0.00125	0.00077
2015	7	0.00060	0.00136	0.00180	0.00085	0.00114	0.00135	0.00118	0.00062
2016	7	0.00061	0.00131	0.00190	0.00087	0.00119	0.00131	0.00120	0.00081
2017	7	0.00058	0.00139	0.00186	0.00085	0.00116	0.00137	0.00120	0.00064
2018	7	0.00057	0.00137	0.00189	0.00085	0.00117	0.00135	0.00120	0.00070
2019	7	0.00055	0.00135	0.00189	0.00083	0.00115	0.00134	0.00118	0.00070
2020	7	0.00055	0.00132	0.00191	0.00082	0.00115	0.00132	0.00118	0.00075

Judged by 16 variables at 0.0008

Yr	M	Q	P	GDPR	Cons	Inv	Exp	Imp	Outr	Wage/E	Infl	Emp	GrGDPr
6	3			522.3	382.0	135.1	80.7	75.5	968.1	4.239	0.07	63820	1.04
7	10	3		534.8	386.8	137.2	87.4	76.8	995.0	4.270	0.34	65157	2.39
8	9	3		525.0	379.5	132.1	89.0	75.7	977.4	4.277	-0.44	63818	-1.83
9	9	3		509.1	369.1	127.7	86.7	74.4	948.5	4.272	-0.61	61773	-3.02
10	9	3		504.4	365.6	125.8	87.6	74.6	940.5	4.284	-0.30	60997	-0.92
11	9	2		505.9	366.7	126.4	88.2	75.5	943.3	4.300	-0.10	60941	0.29
12	10	3		510.1	369.6	128.6	88.6	76.8	950.8	4.324	0.19	61197	0.82
13	10	3		514.7	373.4	130.3	89.2	78.1	958.9	4.368	0.53	61481	0.90
14	10	3		518.7	376.4	130.8	91.0	79.5	966.4	4.424	0.66	61672	0.78
15	9	2		523.0	379.6	131.3	93.1	81.0	974.5	4.465	0.32	61885	0.83
16	9	3		528.0	384.1	132.3	94.3	82.7	983.3	4.517	0.74	62188	0.95
17	9	2		533.1	387.9	133.2	96.1	84.1	992.7	4.555	0.36	62488	0.96
18	9	2		538.0	391.6	134.1	98.0	85.6	1001.7	4.604	0.51	62766	0.93
19	9	2		542.9	395.2	134.9	99.9	87.1	1010.7	4.653	0.52	63026	0.91
20	9	2		547.9	399.3	135.4	101.8	88.6	1019.6	4.710	0.64	63287	0.92

Total execution time: 10 seconds

	iter	Gdpr	Cohr	Iprr	Expr	Impr	Outr	Wag	Pro
2006	10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2007	9	0.00022	0.00036	0.00000	0.00008	0.00008	0.00018	0.00015	0.00047
2008	9	0.00038	0.00045	0.00001	0.00014	0.00011	0.00038	0.00043	0.00034
2009	9	0.00053	0.00069	0.00001	0.00018	0.00011	0.00052	0.00059	0.00023
2010	9	0.00025	0.00027	0.00001	0.00008	0.00014	0.00025	0.00038	0.00054
2011	10	0.00008	0.00001	0.00000	0.00003	0.00015	0.00009	0.00022	0.00074
2012	10	0.00018	0.00029	0.00000	0.00006	0.00006	0.00015	0.00012	0.00048
2013	10	0.00024	0.00038	0.00000	0.00007	0.00002	0.00022	0.00019	0.00046
2014	9	0.00026	0.00039	0.00000	0.00008	0.00004	0.00023	0.00020	0.00045
2015	9	0.00010	0.00023	0.00000	0.00003	0.00014	0.00007	0.00008	0.00079
2016	9	0.00022	0.00040	0.00000	0.00007	0.00010	0.00019	0.00003	0.00078
2017	9	0.00010	0.00024	0.00000	0.00003	0.00013	0.00008	0.00008	0.00079
2018	9	0.00014	0.00029	0.00000	0.00005	0.00013	0.00012	0.00005	0.00078
2019	9	0.00014	0.00028	0.00000	0.00005	0.00012	0.00012	0.00006	0.00078
2020	0	0.00016	0.00031	0.00000	0.00006	0.00012	0.00014	0.00005	0.00078
	iter	Tax	Dep	Oth	Sub	Out	Va	Gdpn	Pdd
2006	0	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2007	iter	0.00008	0.00004	0.00026	0.00016	0.00019	0.00002	0.00010	0.00035
2008	10	0.00004	0.00035	0.00023	0.00016	0.00018	0.00036	0.00022	0.00018
2009	9	0.00003	0.00046	0.00018	0.00012	0.00016	0.00044	0.00025	0.00034
2010	9	0.00007	0.00036	0.00037	0.00021	0.00028	0.00038	0.00030	0.00003
2011	9	0.00009	0.00030	0.00049	0.00026	0.00034	0.00033	0.00031	0.00025
2012	9	0.00004	0.00001	0.00024	0.00012	0.00018	0.00004	0.00010	0.00033
2013	10	0.00004	0.00004	0.00024	0.00011	0.00016	0.00001	0.00009	0.00037
2014	10	0.00005	0.00005	0.00024	0.00010	0.00016	0.00002	0.00008	0.00038
2015	10	0.00011	0.00020	0.00052	0.00024	0.00035	0.00025	0.00028	0.00042
2016	9	0.00012	0.00012	0.00052	0.00023	0.00034	0.00018	0.00026	0.00053
2017	9	0.00011	0.00020	0.00053	0.00024	0.00036	0.00025	0.00029	0.00044
2018	9	0.00011	0.00018	0.00053	0.00023	0.00035	0.00023	0.00028	0.00047
2019	9	0.00010	0.00019	0.00053	0.00023	0.00035	0.00024	0.00028	0.00046
2020	9	0.00010	0.00017	0.00053	0.00022	0.00035	0.00023	0.00028	0.00049

Judged by only GDPr with 0.001

Yr	M	Q	P	GDPR	Cons	Inv	Exp	Imp	Outr	Wage/E	Infl	Emp	GrGDPr
6	3			522.3	382.0	135.1	80.7	75.5	968.1	4.239	0.07	63820	1.04
7	8	3		534.9	387.0	137.2	87.5	76.7	995.3	4.270	0.27	65171	2.42
8	7	3		524.5	379.0	132.1	89.0	75.6	976.5	4.276	-0.33	63766	-1.95
9	5	3		507.1	367.1	127.7	86.6	74.3	945.0	4.274	-0.40	61562	-3.32
10	8	3		503.9	365.2	125.7	87.6	74.5	939.5	4.283	-0.54	60934	-0.63
11	3	4		498.7	358.9	126.3	88.0	74.6	931.2	4.305	-0.06	60181	-1.04
12	7	3		508.7	368.4	128.2	88.6	76.5	948.3	4.323	0.02	61037	2.01
13	7	3		515.0	373.6	130.4	89.2	78.1	959.5	4.367	0.51	61514	1.25
14	7	3		519.3	376.9	130.9	91.1	79.5	967.5	4.424	0.67	61738	0.84
15	7	3		523.6	380.0	131.5	93.1	81.0	975.6	4.464	0.37	61948	0.82
16	7	3		528.3	384.3	132.3	94.3	82.7	983.8	4.516	0.72	62215	0.89
17	7	3		532.9	387.8	133.1	96.1	84.1	992.4	4.554	0.37	62466	0.88
18	7	3		537.8	391.4	134.0	98.0	85.6	1001.3	4.602	0.51	62738	0.92
19	7	3		542.8	395.1	134.9	99.9	87.1	1010.5	4.652	0.52	63011	0.93
20	7	3		548.0	399.3	135.4	101.8	88.6	1019.7	4.709	0.64	63291	0.95

Total execution time: 9 seconds

	iter	Gdpr	Cohr	Iprr	Expr	Impr	Outr	Wag	Pro
2006	3	0	0	0	0	0	0	0	0
2007	8	0.00031	0.00023	0.00001	0.00009	0.00041	0.00033	0.00056	0.00166
2008	7	0.00088	0.00098	0.00002	0.00028	0.00017	0.00082	0.00104	0.0005
2009	5	0.00093	0.00039	0.00003	0.00068	0.00067	0.00082	0.0024	0.00226
2010	8	0.00064	0.00083	0.00001	0.00017	0.00027	0.00062	0.00071	0.00096
2011	3	0.00015	0.01641	0.01406	0.00003	0.0142	0.00053	0.01966	0.01705
2012	7	0.00081	0.00069	0.00002	0.0002	0.00057	0.00075	0.00139	0.00245
2013	7	0.00064	0.00047	0.00002	0.00013	0.00056	0.00057	0.00124	0.00245
2014	7	0.00052	0.00032	0.00002	0.00009	0.00049	0.00045	0.00114	0.00221
2015	7	0.00059	0.00042	0.00002	0.00012	0.00046	0.00052	0.00119	0.00205
2016	7	0.00044	0.00021	0.00001	0.00007	0.00044	0.00038	0.00108	0.00207
2017	7	0.00061	0.00043	0.00002	0.00012	0.00044	0.00053	0.00122	0.00197
2018	7	0.00055	0.00035	0.00002	0.0001	0.00044	0.00048	0.0012	0.002
2019	7	0.00054	0.00033	0.00001	0.00009	0.00043	0.00047	0.0012	0.00198
2020	7	0.00048	0.00025	0.00001	0.00008	0.00042	0.00042	0.00118	0.00197
	iter	Tax	Dep	Oth	Sub	Out	Va	Gdpn	Pdd
2006	0	0	0	0	0	0	0	0	0
2007	iter	0.00045	0.00078	0.00107	0.00064	0.00085	0.00082	0.00081	0.00052
2008	3	0.00004	0.00088	0.00061	0.00043	0.00036	0.00082	0.00049	0.00043
2009	8	0.00081	0.00018	0.00038	0.00115	0.00049	0.00081	0.00026	0.00127
2010	7	0.00023	0.0008	0.00058	0.00028	0.00051	0.00073	0.00059	0.00009
2011	5	0.00804	0.01618	0.04153	0.00509	0.00004	0.01039	0.00089	0.00078
2012	8	0.00064	0.00161	0.00199	0.00104	0.00134	0.00159	0.00138	0.00061
2013	3	0.0007	0.00154	0.00203	0.001	0.00134	0.00151	0.00136	0.00078
2014	7	0.00067	0.00139	0.00193	0.00092	0.00124	0.00138	0.00126	0.0008
2015	7	0.0006	0.0014	0.00185	0.00089	0.00118	0.00136	0.00121	0.00066
2016	7	0.0006	0.00129	0.00188	0.00086	0.00117	0.00129	0.00118	0.0008
2017	7	0.00057	0.00137	0.00184	0.00084	0.00114	0.00136	0.00118	0.00062
2018	7	0.00056	0.00136	0.00188	0.00085	0.00116	0.00135	0.00119	0.00069
2019	7	0.00055	0.00136	0.00189	0.00083	0.00116	0.00135	0.00119	0.0007
2020	7	0.00055	0.00132	0.00192	0.00083	0.00116	0.00133	0.00118	0.00075

By printing out the actual conversion rate, we can identify which function should have a room to be improved.

Following are the old results; Case1: judged by 1 variables, Case2: Judged by gdpr+tocohr(2 variables), Case3: Judged by gdpr+totcohr+totiprr, etc. (13 variables)
Conversion threshold is 0.0001.

Case1: 1 variables

JAPAN INTERINDUSTRY DYNAMIC ECONOMETRIC ANALYSIS (JIDEA)

Version 6.0

Yr	M	Q	P	GDPR	Cons	Inv	Exp	Imp	Emp	Wage/E	Infl	OUTR	GrGDPr
5	2			522.5	387.6	130.4	73.2	68.6	63560	4.034	0.10	953.1	2.26
6	14	5	3	528.8	389.4	132.5	76.6	69.7	63707	4.083	-2.20	970.4	1.20
7	13	5	2	532.5	393.3	133.6	77.7	72.1	64031	4.123	0.07	978.2	0.70
8	14	5	3	540.4	398.4	136.1	80.6	74.7	64746	4.153	1.02	994.9	1.48
9	3	5	6	552.4	409.0	138.3	82.7	77.6	65716	4.191	-0.28	1017.8	2.22
10	13	5	4	554.8	409.3	139.7	86.3	80.5	66533	4.228	2.01	1025.2	0.44

Total execution time: 10 seconds

	iter	Gdpr	1	2	3	4	5	6	7	8	9	10	11	12
2006	15	0.00004	0.00018	0.00027	0.00129	0.00027	0.00001	0.00013	0.00028	0.00001	0.00004	0.00012	0.00002	0.00003
2007	14	0.00003	0.00001	0.00021	0.00075	0.00013	0.00006	0.00009	0.00022	0.00004	0.00001	0.00003	0.00000	0.00005
2008	15	0.00008	0.00047	0.00073	0.00194	0.00014	0.00011	0.00031	0.00104	0.00071	0.00038	0.00074	0.00003	0.00053
2009	4	0.00000	0.00557	0.00728	0.00100	0.00107	0.00025	0.00675	0.01301	0.01153	0.00650	0.01194	0.00008	0.00916
2010	14	0.00006	0.00050	0.00085	0.00196	0.00020	0.00010	0.00040	0.00121	0.00081	0.00044	0.00084	0.00003	0.00063

The model get a solution as there is only one conversion criteria.

Case2: 2 Variables

JAPAN INTERINDUSTRY DYNAMIC ECONOMETRIC ANALYSIS (JIDEA)

Version 6.0

Yr	M	Q	P	GDPR	Cons	Inv	Exp	Imp	Emp	Wage/E	Infl	OUTR	GrGDPr
5	2			522.5	387.6	130.4	73.2	68.6	63560	4.034	0.10	953.1	2.26
6	14	5	3	528.8	389.4	132.5	76.6	69.7	63707	4.083	-2.20	970.4	1.20
7	13	5	2	532.5	393.3	133.6	77.7	72.1	64031	4.123	0.07	978.2	0.70
8	14	5	3	540.4	398.4	136.1	80.6	74.7	64746	4.153	1.02	994.9	1.48
9	3	5	6	552.4	409.0	138.3	82.7	77.6	65716	4.191	-0.28	1017.8	2.22
10	7	4	5	551.9	407.5	138.6	86.0	80.3	66306	4.226	2.34	1019.7	-0.09

Total execution time: 9 seconds

	iter	Gdpr	Chor	2	3	4	5	6	7	8	9	10	11	12
2006	15	0.00004	0.00018	0.00027	0.00129	0.00027	0.00001	0.00013	0.00028	0.00001	0.00004	0.00012	0.00002	0.00003
2007	14	0.00003	0.00001	0.00021	0.00075	0.00013	0.00006	0.00009	0.00022	0.00004	0.00001	0.00003	0.00000	0.00005
2008	15	0.00008	0.00047	0.00073	0.00194	0.00014	0.00011	0.00031	0.00104	0.00071	0.00038	0.00074	0.00003	0.00053
2009	4	0.00000	0.00557	0.00728	0.00100	0.00107	0.00025	0.00675	0.01301	0.01153	0.00650	0.01194	0.00008	0.00916
2010	8	0.00121	0.00002	0.00410	0.00048	0.00088	0.00127	0.00246	0.00381	0.00239	0.00165	0.00255	0.00003	0.00269

The model does not get the solution as the second variable exceeds its convergence threshold..

Case3: 1 3 **Variables**

JAPAN INTERINDUSTRY DYNAMIC ECONOMETRIC ANALYSIS (JIDEA)

Version 6.0

Yr	M	Q	P	GDPR	Cons	Inv	Exp	Imp	Emp	Wage/E	Infl	OUTR GrGDPr
5	2			522.5	387.6	130.4	73.2	68.6	63560	4.034	0.10	953.1	2.26
6	4	5	6	529.5	391.3	131.0	76.6	69.5	63694	4.054	-3.55	971.1	1.33
7	2	5	6	538.2	397.7	134.6	77.8	71.9	64455	4.105	-0.16	988.5	1.64
8	2	5	5	544.1	402.6	135.5	80.6	74.6	65213	4.138	1.60	1001.3	1.11
9	2	5	6	552.8	409.7	138.0	82.8	77.6	65813	4.174	0.22	1018.7	1.60
10	2	5	6	560.0	415.1	139.6	85.6	80.3	66932	4.212	1.13	1033.8	1.30

Total execution time: 3 seconds

	iter	Gdpr	Cohr	Iprr	3	4	5	6	7	8	9	10	11	12
2006	5	0.01175	0.01189	0.01632	0.00235	0.00320	0.01139	0.01282	0.00760	0.00488	0.00515	0.00104	0.00008	0.00940
2007	3	0.00255	0.00318	0.01218	0.00481	0.00149	0.00249	0.01492	0.01525	0.01580	0.00964	0.01410	0.00007	0.01454
2008	3	0.00198	0.00422	0.00878	0.00073	0.00137	0.00210	0.01356	0.01262	0.01321	0.00887	0.01363	0.00004	0.01254
2009	3	0.00358	0.00178	0.01127	0.00054	0.00239	0.00372	0.01445	0.01286	0.01395	0.00900	0.01225	0.00009	0.01346
2010	3	0.00167	0.00483	0.00963	0.00015	0.00206	0.00188	0.01418	0.01464	0.01490	0.00957	0.01475	0.00008	0.01408

The model does not get the solution as many variables exceed their convergence thresholds.

4. Rho.adjust program

   When we run the model, we found that figures before rho adjustment and after rho adjustment were different a little. When the model converge, the model will go back to the top of the program calling for functions to recalculate rho by using flag of setrho='"y".

   It is said this process does not affect the obtained solution at all. However, we found some discrepancies especially in the variables in the nominal term.

   This is because deflators are slightly changed and some variables are affected through the changes of macro variables.

   To avoid this, we decide not to call for rho adjustment function to recalculate rho after conversion in the forecasting period.

   This means that we only use the rho adjustment function to make constant term adjustment.

5. Coefchange:

In the Cyprus conference, we knew that we had to keep the diagonal elements throughout the projection periods.

Following is the program of amfore.add.

```
# amfore -- forecast the A-matrix, from coefficient change regressions
add coefrslt.dat  # bring index in as "x" vector
fdates 2006 2020
f one = 1.
# Extend 2006 amr 2007 to 2020
index 2006 one amr
# copy diagonal element on dump from 2007 to 2020
diagextract amr dump  # as the result dump is all 2006 diagonal value from 2007 to 2020
index 2006 x amr  # this does extrapolate the coefficient change by index x from 2007 to 2020.
# diagonal element should be same as 2006 from 2007 to 2020, then overwrite it by totintr
diaginsert amr dump
q
```

6. Other problems

1) LINT Function

In our database, we do not have 1991 data. Therefore we have to create it. We intended to make it by the average of 1990 and 1992 data.

However, we came across the following phenomenon that the aggregated value of totintr (row total of intermediate input) in the model using Lint function lost balance as shown below.

ono	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
中間投入行計	307,060	310,606	318,340	327,846	373,282	396,387	397,036	398,156	367,696	374,024	409,557
中間投入列計	307,060	310,606	318,340	327,846	373,282	396,387	397,036	398,156	367,696	374,024	409,557
totintr	307,060	310,607	318,340	327,846	373,282	396,387	397,037	398,156	367,696	374,025	409,557
outr-totintr-fdr	0.014	0.026	0.009	-0.003	0.027	-0.016	0.001	0.025	-0.019	-0.001	0.017
	-0	-0	0	-0	-0	-0	-0	1	0	-0	-1

sasai	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
中間投入行計	307059.7	310890.5	318655.01	328167.48	373629.8	396419.5	397069.3	398193	367734.4	374098.2	409557.8
中間投入列計	307059.7	310890.5	318655.01	328167.48	373629.8	396419.5	397069.3	398193	367734.4	374098.2	409557.8
totintr	307060.1	310890.9	318654.85	328167.56	373629.82	396419.5	397069.4	398192.5	367734.2	374098.5	409558.3
outr-totintr-fdr	0	284	315	322	347	24	1,692	3,271	39	74	1
	-0	-0	0	-0	-0	-0	-0	1	0	-0	-0

This is because Lint Function does not accept the term command and apply linear interpolation throughout the data periods even though we intend to do it only 1991 data. We have to be careful when we use this function as this may change data where it is originally zero.

2) Restrictions by variable name;

Using some reserved word such as sin and intr will lead to the compile error.

7．DOSExtender：vamx、idbuildx

8. How to do All.bat by G 7

```
del hist.vam
del *.pmx
rem   Initial file loads A-matrix, final demands, and value added, on
rem   the linked 2000 basis.   This includes the years:
rem   1985, 1990, 1995, 2000 0n 2000 base,(1991 is not exist)
rem   1986, 1987, 1988, 1989 on 1985 base,
rem   1992, 1993, 1994, 1995 on 1990 base,
rem   1996, 1997, 1998, 1999 on 1995 base
rem   2001, 2002 on 1995 base
rem   2003, 2004, 2005, 2006 on 2000 base.
vamx -iinitial
copy am.pmx amr.pmx
```

```
copy hist.vam link.vam
rem    The Across program reconciles the 85- , 90- and 95- based tables with
rem    the 2000 based tables.
rem across¥across >error.txt
rem Use interp file to interpolate for missing years.
vamx -vlink -iinterp
copy link.vam deflated.vam
rem    The Getreal program calculates implicit deflators, and puts the
rem        A-matrix into constant-Yen terms.
rem copy deflated.vam getreal¥deflated.vam
rem copy amr.pmx getreal¥amr.pmx
rem copy am.pmx getreal¥am.pmx
getreal¥getreal
copy deflated.vam jidea.vam
rem Use prep file to prepare exogenous projections for some data.
vamx -vjidea -iprep
vamx -vjidea -iamfore.add
copy amr.pmx amrsav.pmx
rem    Now we are ready to run jidea.
```