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Market Integration in Wholesale Rice Markets in India

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ABSTRACT

This paper tests for market integration in 55 wholesale rice markets in India using monthly data over the period January 1970 – December 1999. The technique of Gonzalez-Rivera and Helfand (2001) is used to identify common factors across various markets. It is discovered that market integration is far from complete in India and a major reason for this is the excessive interference in rice markets by government agencies. As a result it is hard for scarcity conditions in isolated markets to be picked up by markets with abundance in supply. A number of policy implications are also considered.

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I. Introduction

The level of integration of agricultural markets is a critical determinant of agricultural price policy in developing countries, particularly large ones. If agricultural markets are not integrated, then any local food scarcity will tend to persist, as distant markets (with no scarcity) will not be able to respond to the price signals of such isolated markets (Dreze and Sen, 1995). Lack of integration can often lead to localized food scarcity, even famines (Currey and Hugo, 1985). Testing for such integration is, therefore, central to determining the (geographical) level at which agricultural price policy should be targeted, at least in the short-run. If all agricultural markets were not integrated at the national level then a national agricultural price policy would not be suitable. It would be more appropriate to target a common price policy to a set of integrated markets. In the longer run it would be imperative to enhance market integration across the board in order to reap the advantages of a large market.

This paper conducts robust tests for market integration in 55 wholesale rice markets in India. The plan of the paper is as follows. Section II briefly reviews the literature. Section III reviews the data and methodology. Section IV presents the results, section V reviews some restrictions on internal trade in India and section VI concludes. An appendix details of some results not discussed in section IV.

II. A Brief Literature Review - Three generations of market integration studies

Since testing for market integration is central to the design of an agricultural price policy in large developing countries and has been an area of abiding research interest. This literature can be divided into three broad categories. Until recently two broad approaches had been used to investigate market integration: (i) that devised prior to the use of cointegration techniques (e.g. Goletti 1994, Ravallion 1988, Dantwala 1993, and Currey and Hugo 1984); (ii) those using cointegration methods of the Engle-Granger variety (e.g. Dercon 1995, Jha et al. 1997) and those using Johansen maximum-likelihood techniques (e.g. Wilson 2003). To the extent that agricultural prices tested are non-stationary the latter technique is more appropriate. However, recent work has pointed out some deficiencies even in the popular cointegration approach.

The Goletti-Ravallion tests conceive of two forms of market integration. One is between a “central” market and any other market. This involves estimation of (1).

$$P_{it} = \sum_{l=1}^{n} \alpha_{il} P_{i,t-l} + \sum_{k=1}^{N} \sum_{s=0}^{m} \beta^{k}{}_{is} P_{k,t-s} + X_{it} c_i + \varepsilon_{it} \qquad (1)$$

where P_{it} = price in ith central market at time *t;*

P_{kt} = price in kth market at time *t*;

X_{it} = vector of exogenous variables (in high frequency, e.g., monthly data,

time is the sole exogenous variable;

ε_{it} = stochastic error term;

α’s, β’s and c’s are parameters to be estimated.

(1) states that condition on *i* being the central market, the price in the ith market is determined by its own lags and the lagged prices in other markets along with exogenous variables.

The second notion of market integration generalizes the notion of the central market and, therefore, considers bilateral market integration between any pair of markets *i* and *j*. This involves estimation of (2):

$$P_{it} = \sum_{l=1}^{n_1} \alpha_{il} P_{i,t-l} + \sum_{s=0}^{n_2} \beta_{ij,t-s} P_{jt-s} + X_{it} c_i + \varepsilon_{it} \qquad (2)$$

Results in market integration usually involve the following five tests:

(i) **Market Segmentation**

H_0: $\beta_{ij} = 0$ for j = 0,1,2,3, …; $i \neq j$. If this null hypothesis cannot be rejected then we have market segmentation for the ith market from the jth market.

(ii) **Short-run market integration**

This tests whether a price change in the central market will be immediately passed on to the ith market. If this is case then the central market and the ith market are integrated in the short run. This would be the case if

H_0: $\beta_{ij,0}=1$ is accepted.

(iii) **Long-run market integration**

The test for the long-run integration of the ith and jth market is given by testing whether the following restriction holds.

$$\sum_{l} \alpha_{il} + \sum_{s=0} \beta_{ij,t-s} = 1$$

If this is the case then he short-run process of price adjustment described by the model is consistent with and equilibrium in which a unit increase in central prices is passed on (exactly) fully to local prices. Acceptance of short-run market integration implies long-run integration but that the reverse is not necessarily true.

(iv) **Weak Integration**

The test statistic used in this case is

H_0: $\sum_{i} \alpha_i + \sum_{s} \beta_s = 0$ for any *t*. If this null hypothesis is not rejected then the tth period price in the *ith* market is determined by the *t*th period price in the *jth* market.

(v) **No arbitrage Possibilities**

H_0:c_i=0. If this restriction is satisfied then it would follow that the markets are not providing any opportunity for arbitrage and are, hence, efficient in this sense of the term.

In the Indian case while Jha et al. (1997) study market integration using monthly data for 44 centre for rice and 47 centres for wheat using the Engle-Granger methodology. Following from the work of Engle and Yoo (1987) the authors estimate

$$p_{it} = \alpha_0 + \sum_{h} \beta_{ih} p_{i(t-h)} + \sum_{k \neq i} \sum_{v} \gamma_{ik}{}^{k} p_{k(t-v)} + \varepsilon_{it} \qquad (3)$$

where all prices are I(1).

Wilson (2003) uses Johansen's full information likelihood estimation techniques to identify markets that are cointegrated. He estimates

$$\underline{p}_t = \Theta + \sum_{s=1}^{k} \Phi_s \underline{p}_{t-s} + \sum_{\tau=0}^{l} \Psi_\tau \underline{x}_{t-\tau}, \quad \forall t = 1, 2, \ldots, T \qquad (4)$$

The VAR has a general error correction mechanism

$$\text{(ECM): } \Delta \underline{p}_t = \Theta + \sum_{s=1}^{k-1} \Gamma_s \Delta \underline{p}_{t-s} + \Pi \underline{p}_{t-k} + \sum_{\tau=0}^{l} \Psi_\tau \underline{x}_{t-\tau}, \quad \forall t = 1, 2, \ldots, T$$

with $\Pi \underline{p}_{t-k}$ matrix:

$$\Pi \underline{p}_{t-k} = \begin{bmatrix} \pi_{10} & \pi_{11} & . & . & \pi_{1n} \\ \pi_{20} & \pi_{21} & . & . & \pi_{2n} \\ . & . & & & . \\ . & . & & & . \\ \pi_{n0} & \pi_{n1} & . & . & \pi_{nn} \end{bmatrix} \begin{bmatrix} 1 \\ p_{1,t-k} \\ . \\ . \\ p_{n,t-k} \end{bmatrix}$$

The empirical findings suggest greater market integration in the post - reform phase. The paper also quantifies a short run equilibrating price elasticity, which indicates the ability of individual markets to return to equilibrium when faced with short-term commodity price shocks.

However, the work of Gonzalez-Rivera and Helfand (2001) (henceforth GRH) argue that it is not sufficient for market integration to hold that (I(1)) prices in an *n*-market system be cointegrated. In particular, if there is a single common factor linking these markets then there should be n-1 cointegration vectors. However, this is insufficient to validate the bivariate approach. A cointegrated system can be written as a vector error correction model (VEC). In a system with *n* locations each equation of the VEC is likely to contain error correction terms and lags from numerous other locations in the market system. The standard approach necessarily restricts each equation of the VEC to have at most one error correction term and implied lag structures. In most cases this would be a gross misspecification of the model. The GRH model overcomes this problem. Rashid (2004) has also used this methodology.

III. Data and Methodology

With this as background it would not be surprising to discover lack of market integration in agricultural markets in India. That the extant analysis does not pick this up is probably a result of the technology to ascertain such integration.

This paper follows GRH (2001) in using a two-dimensional — trade and information - notion of market integration. For a market to be called integrated, we require that the set of locations share (for the same traded commodity) the same long run information. In other words, a set of *n* markets with I(1) prices there should be linked through a cointegrating vector. Those centres that are not part of this cointegrating set-up cannot be said to integrated. The vector error correction model within this set of cointegrated prices gives indications of short-run market linkages.

Consider an *nx1*non-stationary I(1) vector of log-prices at time *t*: $P_t = [P_{1t,}...,P_{2t}]$ where P_{it} is the log-price at centre i at time period *t*. Suppose that P_t can be decomposed into two components as follows:

$$P_t = A_{nxs} f_t + \tilde{P}_t \qquad (5)$$

where f_t is an sx1 vector of s(s<n) common unit root factors and $\tilde{P}_t$ is an nx1 vector of stationary components. Every element in the vector $\tilde{P}_t$ can be explained by a linear combination of a smaller number of I(1) common factors f_{it} (permanent component) plus an I(0) or transitory component (e.g. $P_{it} = \sum_{j=1}^{s} a_{ij} f_{jt} + \tilde{P}_{it}$). In the long tun the P_{it} move together because they share the same stochastic trends. GRH (2001) argue that as shown by the Granger Representation Theorem (Engle and Granger (1987)) the representation in (5) is guaranteed if an only if there are n-s cointegrating vectors among the elements of the vector P_t. A major result of the Granger Representation Theorem is that a cointegrated system can be written as a Vector Error Correction (VEC) model

$$\Delta P_t = \mu + \Pi P_{t-1} + \Gamma_1 \Delta P_{t-1} + \Gamma_2 \Delta P_{t-2} + ... + \Gamma_p \Delta P_{t-p+1} + \varepsilon_t \qquad (6)$$

where Γ and Π are nxn matrices and Π has reduced rank n-s. The matrix Π can be written as $\Pi = \alpha\beta'$, where α is an nx(n-s) matrix of coefficients and β is an nx(n-s) matrix of cointegrating vectors. Using this expression for Π we get $\Pi P_{t-1} = \alpha\beta' P_{t-1} = \alpha Z_{t-1}$. The error correction term is $Z_{t-1} = \beta' P_{t-1}$ and α is the matrix of adjustment coefficients. The elements of the matrix β cancel the common unit roots in P_t, and in the long run, link the movements of the elements of P_t. Complete market integration in the sense of GRH (2001) requires that s=1 because they are searching for locations that share the same long run information. Searching for just one common factor is equivalent to searching for n-1 cointegrating vectors. In this approach the *economic market* is not given *a priori* by the set of locations where a good is produced and/or consumed. Nor is the existence of cointegrating prices sufficient to find the market. It needs to be found through a multivariate search for a single common factor. In the case of wholesale markets for rice in India we find this to be true for some subsets centres out of a total of 55 that we analyzed. Table 1 details the set of centres analyzed.

Table 1: List of 55 centres for rice studied in this paper.

Serial Number	*Centre*	*State*
1	Nellore	Andhra Pradesh
2	Kakinada,	
3	Vijayavada	
4	Nizamabad	
5	Bhimavaram	
6	Tadepalligudem	
7	Hyderabad	
8	Gauhati,	Assam
9	Tihu	
10	Hailkandi	
11	Ranchi .	Bihar
12	Dumka	
13	Jamshedpur	
14	Arrah	
15	Patna	
16	Sasaram	
17	Rajkot	Gujarat
18	Karnal	Haryana
19	Shimoga	
20	Bangalore	Karnataka
21	Trivandrum	Kerala
22	Kozhikode	
23	Raipur	Madhya Pradesh
24	Raigarh	
25	Jabalpur	
26	Jagdalpur	
27	Durg	
28	Indore	
29	Nagpur	Maharashtra
30	Imphal	Manipur
31	Sambalpur	Orissa
32	Balasore	
33	Jeypore	
34	Cuttack	
35	Amritsar	Punjab
36	Kumbakonam .	Tamil Nadu
37	Madras	
38	Tirunelveli	
39	Chidambaram	
40	Tiruchirapalli	
41	Agartala	Tripura

42	Azamgarh.	Uttar Pradesh
43	Kanpur	
44	Nowgarh	
45	Varanasi	
46	Lucknow	
47	Allahabad	
48	Sainthia	West Bengal
49	Bankura	
50	Contai	
51	Calcutta	
52	Cooch-behar	
53	Balurghat	
54	Siliguri	
55	Delhi	Delhi

We use wholesale prices on medium quality rice for these centres. Monthly data from January 1970 to December 1999 (30 years, 360 data points) from the publication *Agricultural Situation in India* are used).[1]

The modus operandi of the analysis involves searching for the largest number of locations that share n-1 cointegrating vectors in a multivariate VAR framework – the reduced rank VAR proposed by Johansen (1988, 1991). This tests for the rank of Π and, concurrently, estimates the number of cointegrating vectors as well as the vector error correction model. Thus, in contrast to the Engle-Granger two step procedure, as used in Jha et al. (1997) and other contributions, this is a single step procedure and, hence, more efficient. Along with identifying the number of cointegrating relations and estimating them, this procedure also estimates the short-run dynamics. Further, the existence of n-1 cointegrating vectors means that the vectors can be normalized in such a way that there are conitegrating relations between any pair of centres. However, a bivariate analysis is not justified since the true relationship between the markets is still a multivariate one.

In line with GRH(2001) we start with the full set of 55 markets over the period January 1970 to December 1999 (monthly data). We conduct the ADF and KPSS tests to confirm that the (natural logs) of these price series are all I(1).[2] We begin with all the *n* centres and test whether we can find n-1 cointegrating vectors using the trace test based on the likelihood statistic. Since there are less than n-1

[1] Other sources of data for the analysis in this paper include (i) *Agricultural Marketing in India,* Ministry of Food and Agriculture, GOI; (ii) *Agricultural Prices in India,* Ministry of Food and Agriculture, GOI; (iii) *Area and Production of Principal Crops in India,* Ministry of Food and Agriculture, GOI (iv) *Economic Survey,* GOI (various years); (v) *Farm Harvest Prices of Principal Crops in India*, Ministry of Food and Agriculture, GOI; (vi) *Five-Year Plan Documents,* GOI and *(vii) Union Budget, 2004-05*, GOI.

[2] These results are not reported here to conserve space. Monthly dummies are added.

cointegrating vectors we conduct a search of the subsets of these centres for which this holds. This procedure is continued until we identify all the sets of centres for which this result holds. As GRH (2001) indicate this sequential procedure is subject to some pre-testing problems and its econometric rationale needs further study. However, this methodology provides a much more robust methodology for the test of market integration than extant techniques (Rashid, 2004).

Finally we estimate the common factor, f_{1t} for each of these subsets. This is derived from the specification of the error correction model (6). Two conditions are needed to identify the common factor. The first imposes the condition that f_{1t} be a linear combination of the vector of prices $\{P_{1t},\ldots,P_{nt}\}$ so that $f_{1t}$is observable. The second condition requires that in (5) the transitory component $\tilde{P}_t$ does not Granger-cause the permanent component Af_{1t} in the long run. Thus any shock that affects the transitory component is not transmitted to the long-run forecast of P_t. This condition implies that in the vector error correction model the only linear combination of $\{P_{1t},\ldots,P_{nt}\}$such that $\tilde{P}_t$ does not have any long run effect on P_t is

$$f_{1t} = \alpha_o' P_t \qquad (7)$$

where $\alpha_o'\alpha = 0$. This orthogonality condition meant that the vector α_o eliminates the error correction term $Z_{t-1} = \beta' P_{t-1}$ from the vector error correction model, guaranteeing no effect of the transitory component on the long run forecast of P_t. Equation (7) can be used to reveal the locations that contribute to the transmission of long run information. This is important for the design of economic policy. Price support, or stabilization policies, for example, could be targeted at those locations that form f_{1t}. The transmission of policy to the rest of the market would be guaranteed.

V. Results

In Table 2 we report the largest set of common factors across various wholesale rice markets in India, e.g., all centres in Common factor 1 are integrated with 6 cointegrating vectors across them. Subsets of these markets also satisfy these conditions but are not reported here. Also omitted is any mention of bilateral market integration between any two markets.

Table 2: Common factors across various Wholesale rice markets in India

	Bangalore	Nellore	Kakinada	Vijayvada	Nizamabad	Tadepalli	Hyderabad
Common factor 1	0.55	0.05	0.002	0.151	0.07	0.07	0.8
	Trivandrum	Guahati	Amritsar				
	0.29	0.84	0.44				
Common factor 2	0.78	0.07	0.07	0.03	0.07	0.6	
	Gauhati	Tihu	Haikandi				
Common Factor 3	0.99	0.008	0.05				
	Kakinada	Sambalpur	Balasore	Jeypore	Cuttack		
Common factor 4	0.91	0.18	0.02	0.36	0.03		
	Ranchi	Dumka	Arrah	Patna	Jamshedpur		
Common factor 5	0.49	0.51	0.42	0.42	0.37		

The size of any individual coefficient in any common factor in Table 2 indicates the contribution of that centre to the long run price connecting the markets in the particular common factor. Thus in the first common factor Hyderabad, has the strongest influence followed by Bangalore, Vijaywada and so on. Common factors 3 and 5 involve centres within the same state (Assam in the case of common factor 3 and Bihar in the case of common factor 5) whereas centres in Common factor 1 and 4 belong to states that are contiguous (Karnataka and Andhra Pradesh in the case of Common Factor 1 and Andhra Pradesh and Orissa in the case of Common factor 4). Common factor 2 is the only one where the centres are separated by considerable distances. What is remarkable about Table 2 is the relative paucity of market integration in rice markets.

Diagnostic statistics for the results are noted in Table 3. Lag selection was done on the basis of minimizing the Akaike Information Criterion (AIC).

Table 3: Diagnostic Statistics for various Common Factors

Common Factor 1

	AIC	=	-16.7265
Log likelihood = 3140.4	HQIC	=	-16.1329
Det(Sigma_ml) = 5.95e-17	SBIC	=	-15.2337

Common Factor 2

	AIC	=	-8.9063
Log likelihood = 1644.681	HQIC	=	-8.70843
Det(Sigma_ml) = 2.11e-08	SBIC	=	-8.40871

Common Factor 3

	AIC	=	-8.99795
Log likelihood = 1661.132	HQIC	=	-8.80008
Det(Sigma_ml) = 1.92e-08	SBIC	=	-8.50037

Common Factor 4

	AIC	=	-14.4932
Log likelihood = 2689.536	HQIC	=	-14.1147
Det(Sigma_ml) = 2.14e-13	SBIC	=	-13.5413

Common Factor 5

	AIC	=	-14.2942
Log likelihood = 2653.816	HQIC	=	-13.9157
Det(Sigma_ml) = 2.61e-13	SBIC	=	-13.3423

Table 4 indicates that it was important to estimate the vector error correction models (separately) as systems. In the case of the first common factor, for instance, all the error correction terms are significant.

Table 4: Significance of Vector Error Correction Terms

Common Factor 1

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_lbangalore	18	0.048014	0.1871	78.2374	0
D_lnellore	18	0.084656	0.2365	105.3127	0
D_lkakinada	18	0.063775	0.2543	115.9615	0
D_lvijayawa	18	0.057628	0.2482	112.2377	0
D_lnizamabad	18	0.070069	0.1176	45.30648	0.0004
D_ltadepalligu~m	18	0.06636	0.256	116.9701	0
D_lhyderabad	18	0.148814	0.4074	233.7344	0

Common Factor 2

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_ltrivandrum	14	0.041752	0.085	31.9676	0.004
D_lgauhati	14	0.065689	0.2078	90.24388	0
D_lamritsar	14	0.056823	0.0976	37.18942	0.0007

Common Factor 3

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_lgauhati	14	0.06497	0.2251	99.90458	0
D_ltihu	14	0.041159	0.0747	27.76145	0.0153
D_lhailkandi	14	0.058766	0.0952	36.18289	0.001

Common Factor 4

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_lkakinada	16	0.0641	0.2423	109.3593	0
D_lsambalpur	16	0.050348	0.2412	108.6867	0
D_lbalasore	16	0.063545	0.3047	149.8612	0
D_ljeypore	16	0.062275	0.3066	151.2031	0
D_lcuttack	16	0.046538	0.3258	165.2758	0

Common Factor 5

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_lranchi	16	0.054861	0.2164	94.44115	0
D_ldumka	16	0.072145	0.3068	151.3524	0
D_larrah	16	0.065826	0.2762	130.5181	0
D_lpatna	16	0.057465	0.2853	136.5444	0
D_ljamshedpur	16	0.047774	0.2299	102.1048	0

Results on the vector error correction terms and the normalized cointegrating vectors are reported in the Appendix. In Table 5 we denote results on the non-parametric tests for the significance of the cointegrating vectors.

Table 5: Significance of Cointegrating Vectors

Common Factor 1

Equation	Parms	chi2	P>chi2
_ce1	1	130.32	0
_ce2	1	91.0163	0
_ce3	1	185.8059	0
_ce4	1	242.0389	0
_ce5	1	118.855	0
_ce6	1	96.69669	0

Common Factor 4

Equation	Parms	chi2	P>chi2
_ce1	1	66.82363	0
_ce2	1	161.4212	0
_ce3	1	193.6072	0
_ce4	1	85.60506	0

Common Factor 2

Equation	Parms	chi2	P>chi2
_ce1	1	31.64788	0
_ce2	1	5.243591	0.022

Common Factor 5

Equation	Parms	chi2	P>chi2
_ce1	1	291.9082	0
_ce2	1	274.5403	0
_ce3	1	115.6697	0
_ce4	1	163.222	0

Common Factor 3

Equation	Parms	chi2	P>chi2
_ce1	1	42.42805	0
_ce2	1	72.78132	0

The results discussed above pertain to integration when more than two centres are involved. In table 6 we report on absence of market integration on a bilateral basis in markets not included in the five integrating relations studied[3] in Tables 2–5.

[3] Patterns of bilateral integration are not reported here to conserve space but are available from the corresponding author.

Table 6: Absence of market integration in markets not included in Table 2

Centre	*State*	*Not bilaterally cointegrated with*	
		Centres outside State	*Centres within state*
Bhimavaram	Andhra Pradesh	Agartala, Sainthia, Cooch-behar, Balurghat, Gauhati, Dumka, Nagpur, Imphal, Kumbakonam, Madras, Tirunelveli, Tiruchirapalli	Tadepalligudem, Hyderabad
Sasaram	Bihar	Nizamabad, Tihu, Hailkandi, Rajkot, Delhi, Karnal, Shimoga, Trivandrum, Kozhikode, Raigarh, Jabalpur, Jagdalpur, Indore, Sambalpur, Balasore, Cuttack, Amritsar, Madras, Agartala, Azamgarh., Nowgarh, Varanasi, Lucknow, Bankura	Arrah, Ranchi, Jamshedpur
Rajkot	Gujarat	Tihu, Haikandi, Sasaram, Karnal, Trivandrum, Kozhikode, Jabalpur, Indore, Amritsar, Madras, Agartala, Calcutta	
Karnal	Haryana	Tihu, Haikandi, Jamshedpur, Sasaram, Rajkot, Kozhikode, Jabalpur, Durg, Indore, Amritsar, Madras, Agartala, Varanasi	
Shimoga	Haryana	Tihu, Sasaram, Jabalpur, Indore, Amritsar, Madras, Agartala	
Kozhikode	Kerala	Tihu, Haikandi, Sasaram, Rajkot, Karnal, Trivandrum, Jabalpur, Durg, Indore, Amritsar, Madras, Agartala, Calcutta, Siliguri	
Raipur	Madhya Pradesh	Tadepalligudem, Hyderabad, Gauhati, Nagpur, Imphal, Tiruchirapalli, Sainthia, Cooch-behar	
Raigarh	Madhya Pradesh	Tihu, Haikandi, Sasaram, Trivandrum, Amritsar, Agartala, Varanasi, Allahabad, Calcutta, Lucknow	Jabalpur, Indore
Jabalpur	Madhya Pradesh	Tihu, Haikandi, Ranchi, Jamshedpur, Arrah, Sasaram, Rajkot, Karnal, Shimoga, Bangalore, Trivandrum, Kozhikode, Nagpur, Sambalpur, Balasore, Cuttack, Amritsar, Madras, Agartala, Azamagarh, Nowgarh, Varanasi, Lucknow, Bankura, Contai, Calcutta, Siliguri, Delhi	Raigarh, Jagdalpur, Durg, Indore
Jagdalpur	Madhya Pradesh	Tihu, Haikandi, Sasaram, Madras, Agartala, Calcutta,	Jabalpur,
Durg	Madhya Pradesh	Tihu, Haikandi, Karnal, Trivandrum, Kozhikode, Amritsar, Madras, Agartala, Calcutta,	Jabalpur, Indore
Indore	Madhya Pradesh	Nizamabad, Tihu, Haikandi, Sasaram, Rajkot, Karnal, Shimoga, Trivandrum, Kozhikode, Cuttack, Amritsar, Madras, Agartala, Azamgarh, Varanasi, Bankura, Calcutta, Siliguri	Raigarh, Jabalpur, Durg,
Nagpur	Maharashtra	Kakinada, Bhimavaram, Tadepalligudam, Hyderabad, Gauhati, Tihu, Haikandi, Dumka, Trivandrum, Raipur, Jabalpur, Imphal, Jeypore, Kumbakonam, Madras, Tirunelvelili, Chidambaram, Tiruchirapalli, Agartala, Kanpur, Allahabad, Calcutta, Cooch-behar, Balurghat, Lucknow	
Imphal	Manipur	Kakinada, Bhimavaram, Tadepalligudam, Hyderabad, Gauhati, Dumka, Raipur, Nagpur, Jeypore, Kumbakonam, Tirunelvelili, Chidambaram, Tiruchirapalli, Kanpur, Allahabad, Sainthia, Cooch-behar, Balurghat	
Kumbakonam	Tamilnadu	Kakinada, Vijaywada, Bhimavaram, Tadepalligudam, Hyderabad, Gauhati, Dumka, Arrah, Patna, Nagpur, Imphal, Jeypore, Kanpur, Lucknow, Allahabad, Sainthia, Cooch-behar, Balurghat	Tirunelvelili, Chidambaram, Tiruchirapalli,
Madras	Tamilnadu	Nizamabad, Bhimavaram, Tihu, Haikandi, Ranchi, Jamshedpur, Arrah, Patna, Sasaram, Rajkot, Karnal, Shimoga, Bangalore, Trivandrum, Kozhikode, Jabalpur, Jagdalpur, Durg, Indore, Nagpur, Sambalpur, Balasore, Cuttack, Amritsar, Azamgarh, Kanpur, Nowgarh, Varanasi, Lucknow, Allahabad, Bankura, Contai, Calcutta, Siliguri, Delhi	
Tirunelveli	Tamilnadu	Kakinada, Vijaywada, Bhimavaram, Tadepalligudam, Hyderabad, Gauhati, Dumka, Arrah, Nagpur, Imphal, Sambalpur, Jeypore, Agartala, Kanpur, Sainthia, Cooch-behar, Balurghat	Kumbakonam,
Chidambaram	Tamilnadu	Kakinada, Vijaywada, Bhimavaram, Tadepalligudam, Hyderabad, Gauhati, Dumka, Nagpur, Imphal, Jeypore, Kanpur, Sainthia, Cooch-behar, Balurghat	Kumbakonam, Tiuchirapalli

Tiruchirapalli	Tamilnadu	Kakinada, Vijaywada, Bhimavaram, Tadepalligudam, Hyderabad, Gauhati, Dumka, Patna, Raipur, Nagpur, Imphal, Jeypore, Kanpur, Sainthia, Cooch-behar, Balurghat	Kumbakonam, Chidambaram
Agartala	Tripura	Nizamabad, Bhimavaram, Tihu, Haikandi, Ranchi, Jamshedpur, Arrah, Agartala, Sasaram, Rajkot, Karnal, Shimoga, Bangalore, Trivandrum, Kozhikode, Raigarh, Jabalpur, Jagdalpur, Durg, Indore, Nagpur, Sambalpur, Balasore, Cuttack, Amritsar, Tirunelveli, Azamgarh, Kanpur, Nowgarh, Varanasi, Lucknow, Allahabad, Contai, Siliguri, Delhi	
Azamgarh.	Uttar Pradesh	Tihu, Haikandi, Sasaram, Trivandrum, Jabalpur, Indore, Amritsar, Madras, Agartala, Calcutta	
Kanpur	Uttar Pradesh	Tadepalligudam, Gauhati, Tihu, Nagpur, Imphal, Kumbakonam, Madras, Tirunelveli, Chidambaram, Tiruchirapalli, Agartala	
Nowgarh	Uttar Pradesh	Sasaram, Jabalpur, Amritsar, Madras, Agartala	
Varanasi	Uttar Pradesh	Tihu, Haikandi, Sasaram, Karnal, Trivandrum, Raigarh, Jabalpur, Indore, Amritsar, Madras, Agartala, Calcutta	
Lucknow	Uttar Pradesh	Tihu, Haikandi, Sasaram, Jabalpur, Kumbakonam, Madras, Agartala, Calcutta, Tihu, Haikandi, Trivandrum, Raigarh, Nagpur	
Allahabad	Uttar Pradesh	Tihu, Haikandi, Trivandrum, Raigarh, Nagpur, Imphal, Kumbakonam, Madras, Agartala, Calcutta	
Sainthia	West Bengal	Bhimavaram, Tadepalligudam, Hyderabad, Gauhati, Dumka, Raipur, Imphal, Jeypore, Kumbakonam, Tirunelveli, Chidambaram, Tiruchirapalli	Cooch-behar, Balurghat
Bankura	West Bengal	Sasaram, Jabalpur, Indore, Madras	
Contai	West Bengal	Tihu, Sasaram, Jabalpur, Madras. Agartala	
Calcutta	West Bengal	Haikandi, Jamshedpur, Sasaram, Rajkot, Kozhikode, Raigarh, Jabalpur, Jagdaplur, Durg, Indore, Nagpur, Cuttack, Madras, Azamgarh, Varanasi, Lucknow, Allahabad, Delhi	
Cooch-behar	West Bengal	Kakinada, Bhimavaram, Tadepalligudem, Hyderabad, Gauhati, Dumka, Raipur, Nagpur, Imphal, Balasore, Jeypore, Kumbakonam, Tirunelveli, Chidambaram, Tiruchirapalli,	Sainthia, Balurghat
Balurghat	West Bengal	Bhimavaram, Tadepalligudam, Hyderabad, Gauhati, Dumka, Nagpur, Imphal, Jeypore, Kumbakonam, Tirunelveli, Chidambaram, Tiruchirapalli	Sainthia, Cooch-behar
Siliguri	West Bengal	Tihu, Haikandi, Sasaram, Trivandrum, Kozhikode, Jabalpur, Indore, Amritsar, Madras, Agartala	
Delhi		Tihu, Haikandi, Sasaram, Trivandrum, Jabalpur, Amritsar, Madras, Agartala, Calcutta	

Table 6 provides some indication of the reasons behind the relative lack of market integration in rice markets. A major centre like Madras, for example, is not integrated on a bilateral basis with as many as 35 centres outside the state in which it lies (Tamilnadu) but is integrated on a bilateral basis with all the centres within Tamilnadu. This broad qualitative result appears quite general. Any given centre in any state is more likely to be integrated on a bilateral basis with other centres within the state than with those outside it. This indicates that there are barriers to market integration across states. We discuss some aspects of this in the next section.

V. Restrictions on Internal trade

The share of internal trade was 13.4 percent of GDP, in real terms, in 2001-02. The growth rate during the 1990s was 6.9 percent per annum. Despite this internal trade is amongst the most repressed sectors of the economy, even today. There are controls and restrictions exercised by multiple authorities, at various levels. This results in serious barriers to trade at the inter-state and inter-district levels. There are differences in taxes and standards across the country. As a result of these restrictions and differentials the all-India market is fragmented. Traders are obliged to obtain licenses for trading and there are different authorities for issuing licenses for different goods. The process is highly time consuming, cumbersome, costly, variable and invariably corrupt. After obtaining a license the trader is faced with over 400 laws that govern trading. This plethora of restrictions and inherent differentials across the country prevent rational and uniform pricing strategies. The price differentials, in turn, do not reflect inherent market conditions and allow local scarcities to remain. The restrictions on trade prevent arbitrage possibilities, which could possibly help remove short-term price differentials. Some of the most important trade restrictive laws are:

1. The Essential Commodities Act, 1955.
2. Standard of Weights and Measures Act, 1976.
3. Agricultural Produce Marketing Acts.
4. Various Agricultural Commodity Control Orders.
5. Prevention of Food Adulteration Act, 1955.
6. State Levy Control Orders.

The first Act controls production, storage, transport, distribution, use or consumption of a wide range of commodities. It authorizes the Central Government to issue Orders for "increasing cultivation of foodgrains", "controlling prices", "regulating or prohibiting any commercial or financial transactions in food items" and "collecting any information", amongst other things. The State Levy Orders make it compulsory for private rice mills to supply 7 to 75 percent of their production to the Food Corporation of India and the State Government, for the Public Distribution System. The important point with such Orders is that the price received by the millers is ‘pan-territorial and pan-seasonal’. It is based on the Minimum Support Price for paddy plus average milling cost. Thus, for a major part of their output mills are not free to fix their price in accordance with economic considerations.

Government Food Supplies

Wheat and rice are the two principal foodgrains used by the Central Government for market price stabilization and for ensuring food security through the Public Distribution System. Rice is mainly procured for the Central Pool from a levy imposed on the rice millers/traders under the Essential Commodities Act, 1955 and the levy orders issued by the State Governments. The foodgrains stock maintained in the Central Pool by the Government is basically utilized for distribution to states for the PDS. The Food Corporation of India (FCI) has been the agent of the Government of India in the implementation of its grain policy. It was set up in 1964 “to undertake the purchase, storage, movement, transport, distribution and sale of food grain and other foodstuffs”.

Earlier, grain procurement was largely confined to wheat and rice in the traditionally surplus states. This operation has now been extended to other states to provide price support to growers. Continuous availability of foodgrain is ensured through about 4.5 lakhs fair price shops spread throughout the country. A steady availability of foodgrains at fixed prices is assured which is lower than actual costs due to government policy of providing subsidy that absorbs a part of the economic cost (about 45%). The stocks are issued at highly subsidized to Below Poverty Line (BPL) families. There are a number of public schemes, like Antodaya Anna Yojana, Mid-Day-Meals Scheme, Sampoorna Gramin Rozgar Yojana, etc., under which food (rice and wheat) is supplied at highly subsidies rates or for free. Apart from these schemes a substantial part of the government supply goes to defence establishments. All these amount to a very serious direct intervention in the wholesale grain market, by the government. The Central government issues grain at the Central Issue Prices (CIP). This is then sold in the retail market by state government and other authorities at retail prices through the Public Distribution System (PDS) and other sources. As regards to the price fixation it is done on a very adhoc basis. Most importantly, there is no dynamism about the price fixation. For instance, *the government of India Economic Survey –1999 noted that the Central Issue Prices (CIP) for the PDS (Public Distribution System) had not been revised since 1st February, 1994 despite the year to year upward revisions effected in minimum support prices.* CIP for PDS for wheat was Rs. 402 per quintal (Rs. 352 per quintal for RPDS (Revamped Public Distribution System)) and for rice Rs. 537 per quintal for the common variety, Rs.617 per quintal for fine and Rs. 648 per quintal for super fine quality respectively. For RPDS areas, CIP is Rs.50 per quintal less than the CIP for PDS areas. Constant CIP of rice and wheat has resulted in a higher food subsidy burden on the Government.

The State Governments fix the 'retail end' prices for PDS and RPDS after taking into account the transportation cost and dealers' commission, etc. Some States have fixed the 'retail end' prices for PDS and RPDS consumers even lower than the CIP. The Government of Andhra Pradesh, Tamilnadu and Orissa operate a scheme for rice at Rs. 2 per kg. and Government of Gujarat operates a scheme for wheat at Rs. 2 per kg. and the consequent additional subsidy is therefore borne by these States.

In the years, when public stocks fall below the minimum buffer stock norms or when production shortfalls are anticipated, the Government takes recourse to imports for augmenting the buffer stocks. However, depending on the behaviour of the open market prices and the stock position in the Central Pool, the public stock of foodgrains is also utilized for market intervention as an instrument of supply management policy. This form of intervention is rather recent. It has been possible only due to the surplus grain situation. The grain markets in India suffer from a highly significant quantitative intervention due to all the schemes quoted above, as well as, a serious distortion in prices due to government pricing policy, which amounts to a non-pricing policy. Therefore, there are three factors originating in government policy and impinging upon the market:

a. Quantitative interventions.

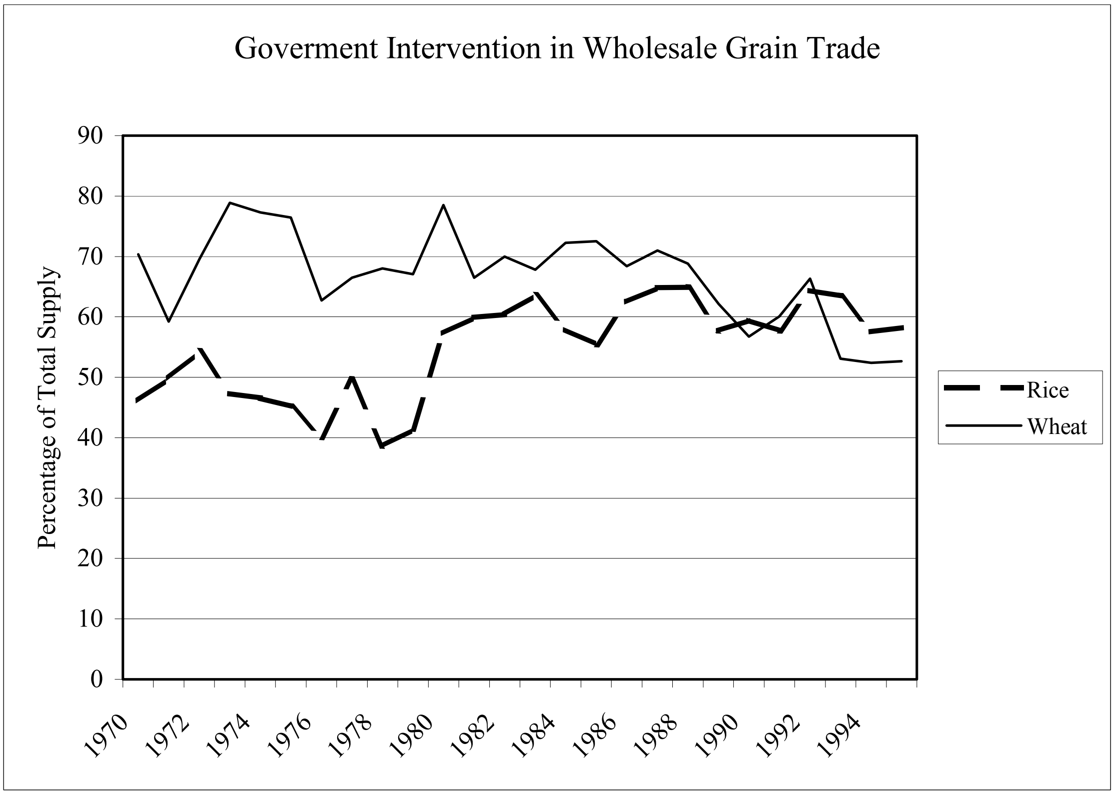
b. Price distortions, at various levels — farm, wholesale and retail.

c. Heavy subsidies.

The concern here is that if India continues to have good crops and if open sales pick-up then while these distortions persist, in the years to come, there would only be an unwarranted increase in these distortions.

It can be seen that the order of the government intervention is huge. We have taken the trends in total government supply, total market arrivals and arrived at the total supplies. Using these we arrive at the percentage share of the government in the wholesale markets for grain. The trends are from 1970 to 1995.[4] The trends, which can be seen in Figure 1 show a small rise in percentage of government supplies of rice over wheat in recent years. But this is reflective of the overall substitution of demand towards rice in the country. Table 7 and 8 further emphasize this point. Thus the impact of government in grain trade is massive and serious, both in quantitative terms as well as price terms.

Figure 1



[4] The data is from All India Food Statistics, DES, Ministry of Agriculture, GOI.

Table 7: Average Government Supply as a percentage of Total Supply of Wheat (1970-95)	
State	*Percentage*
Andhra Pradesh	98.56468392
Bihar	89.01432545
Gujarat	59.57122853
Haryana	19.54612708
Madhya Pradesh	56.33779013
Maharashtra	88.18409557
Karnataka	93.8750001
Punjab	10.33546167
Rajasthan	51.80106295
Uttar Pradesh	34.02207643
India*	66.73544171

* The India figure is obtained as a weighted average.

Table 8: Average Government Supply as a percentage of Total Supply of Rice During 1970-95	
Andhra Pradesh	37.10653573
Bihar	27.33808512
Gujarat	61.85753784
Haryana	4.017281192
Kerala	94.92623017
Madhya Pradesh	59.51119554
Maharashtra	86.47153477
Karnataka	46.52830733
Orissa	43.592039
Punjab	0.254909453
Tamil Nadu	34.52495823
Uttar Pradesh	15.91028157
West Bengal	65.14454229
India	55.07647142

Apart from the above restrictions there are serious fiscal and financial constraints. The main financial constraint operates due to very low organized banking sector credit (between 2-4 percent) being advanced to trade. The margin requirements, which are meant to control speculation and prices, set by Reserve Bank of India, prevent such lending. Since majority of traders are small and medium traders they do not have enough storage capacity. This, coupled with deficient credit availability, has the effect of preventing optimal inventory holdings, and ironically, creates artificial shortages and higher prices. In addition as discussed above, the state plays a dominant role in wholesale grain trade and thus reduces the scope for efficient transmission of market signals.

Indian states have wide powers of taxation. Under the Indian constitution they can collect revenue on land and buildings, agricultural land and income, mineral rights, alcohol and narcotic substances (except tobacco), entry of goods into a local area for consumption or sale, electricity consumption or sale, sale of goods except newspapers but including works contracts and goods sold through hire purchase, motor vehicles, boats, transport of goods or passengers by road or inland waterways, and roads or inland waterway tolls, professions, luxuries, entertainment and gambling, stamp duties and registration fees on documents and court fees collected through judicial stamp duties. Some important facts about these tax powers are: (i) interstate movement of goods are taxed, (ii) states do not have the right to tax services, (iii) state tax rates on different commodities do not have to be harmonized across states; (iv) the state sales tax structure co-exists with a central sales tax – the CENVAT - and with the central excise tax. This amounts to an uncoordinated and inefficient tax structure. The state level VAT which was implemented on 1 April 2005 is designed to simplify this tax structure at the state end but is highly unsatisfactory at the present time.[5]

[5] The basic structure of the VAT is as follows: (i) it has been imposed only on goods (since the states cannot yet tax services); (ii) A total of 550 items are slated to come under the purview of the VAT. However, there will be multiplicity of rates. There are two principal rates – of 4 percent on basic goods (with some basic goods and many unprocessed agricultural products being exempt) and capital goods and declared goods - with the rest of the goods being taxed at 12.5 percent. While these state level taxes would be uniform across the country the central sales tax would continue to apply on interstate trade, although there is a proposal to phase out this tax. (iii) Exports as of now would be zero-rated whereas customs duties on imports would continue to be collected by the central government; like the sales tax now, the VAT chain would commence with the first sale post-import. (iv) States have been advised, but not required, to subsume other taxes such as entry taxes, the octroi and turnover taxes into the VAT. On the surface then this tax reform appears to represent a major simplification of the states' tax structure that should provide a fillip to integrating India's considerably fractured domestic market. However, appearances can be deceptive as a number of problems with the VAT remain. First, the policy measure has simply ignored the problem of taxing inter-state sales. It recommends removing the central sales tax on interstate transactions but fails to lay down a road map for doing this. Complicating this is the fact that rules for deducting costs of inputs brought in from out of state have not been laid down. This will then create a bias for using inputs from within the state. Hence a major alleged advantage of the VAT structure – creating an integrated national market – might remain elusive. The exclusion of services from the ambit of VAT is a serious omission. With services constituting 52 percent of India's GDP the distinction between goods and service inputs may often become blurred. In fact the whole area of service taxation needs to be carefully considered and integrating it with a goods tax should have become the foundation of an efficient VAT as is the case in most developed countries which levy the VAT.
The failure to bring imports into the VAT chain is a handicap as it means denial of set-off on customs duties paid on imports. This will create a cost bias in favour of industries using purely

VI. Conclusions

This paper conducts robust tests for market integration in wholesale rice markets in India. The results indicate absence of such integration across many subsets of these centres.

This paper has identified the existing labyrinth of controls and government intervention in rice markets, however well intentioned, as counterproductive and responsible for such fragmentation of rice markets. Such fragmentation hurts efficiency of agricultural operations and isolates some markets stunting the functioning of market signals. Much has been written about state discretion and autonomy in some matters of economic policy in India. This is not the place to debate this point but it should be pointed out that this latitude should not extend to placing restrictions on internal trade. Furthermore, this has nothing to do with decentralization of decision-making. An economy such as the US, which is considerably more decentralized than India's, still bans most, if not all, impediments to inter-state trade.

Thus there is an urgent need to reform the rules governing interstate commerce in foodgrains and to overhaul the attendant state government tax policies and regulations. There is an urgent need to reform price policy at the levels of producer, wholesaler and consumer.[6] In addition, it is crucial to privatize wholesale grain in free trade and thus improve the efficiency of market signals. These policy measures are long overdue.

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domestic inputs and, hence, act as a protectionist measure. The implications of this step have not yet been worked out. Another drawback is that the government's policy paper talks of input tax credit rather than of tax credit on purchases made in the course of production. This is an important distinction and lack of clarity on this issue may lead to much unnecessary litigation and, hence, raise transactions costs. Other major reforms – outside the sales tax structure – need to be carried out as well. For instance, India's stamp duties are among the highest in the world and lead to considerable under-valuation of property for sale purposes. This contributes significantly to the underground economy. A reduction and harmonization of these rates across Indian states and integration with the VAT is long overdue. Even this rather inefficient VAT structure has not been adopted throughout the country – five major states have opted out of it.

[6] For a review of this literature see Gulati and Rao (1992), Gulati and Sharma (1997), Gulati et al. (1996) and Persaud and Rosen (2003).

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Appendix: Results on Common Factors

Table A.1 Vector Error Correction Models

Common Factor 1

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
D_lbangalore						
_ce1 L1	-0.22414	0.031678	-7.08	0	-0.28623	-0.16205
_ce2 L1	-0.04808	0.019342	-2.49	0.013	-0.08599	-0.01017
_ce3 L1	0.098699	0.032742	3.01	0.003	0.034526	0.162872
_ce4 L1	0.068098	0.034276	1.99	0.047	0.000918	0.135279
_ce5 L1	0.037454	0.021008	1.78	0.075	-0.00372	0.078629
_ce6 L1	-0.02031	0.029446	-0.69	0.49	-0.07802	0.037408
_SG_2	0.025843	0.012623	2.05	0.041	0.001103	0.050583
_SG_3	0.012529	0.012792	0.98	0.327	-0.01254	0.0376
_SG_4	-0.00105	0.012824	-0.08	0.935	-0.02619	0.024084
_SG_5	0.008878	0.012839	0.69	0.489	-0.01629	0.034043
_SG_6	0.006461	0.012899	0.5	0.616	-0.01882	0.031744
_SG_7	0.0074	0.01278	0.58	0.563	-0.01765	0.032449
_SG_8	0.010994	0.01275	0.86	0.389	-0.014	0.035984
_SG_9	0.010869	0.012713	0.85	0.393	-0.01405	0.035786
_SG_10	-0.00816	0.012685	-0.64	0.52	-0.03303	0.016698
_SG_11	0.007091	0.012655	0.56	0.575	-0.01771	0.031894
_SG_12	0.004245	0.012548	0.34	0.735	-0.02035	0.028838
_cons	-0.0087	0.009846	-0.88	0.377	-0.028	0.010596
D_lnellore						
_ce1 L1	-0.02593	0.055853	-0.46	0.642	-0.1354	0.083541
_ce2 L1	-0.21823	0.034104	-6.4	0	-0.28507	-0.15139
_ce3 L1	0.138283	0.057729	2.4	0.017	0.025136	0.25143
_ce4 L1	0.106757	0.060434	1.77	0.077	-0.01169	0.225206
_ce5 L1	0.055175	0.03704	1.49	0.136	-0.01742	0.127772
_ce6 L1	-0.03453	0.051918	-0.67	0.506	-0.13628	0.06723
_SG_2	-0.0335	0.022256	-1.51	0.132	-0.07712	0.010118
_SG_3	-0.07629	0.022554	-3.38	0.001	-0.1205	-0.03209
_SG_4	-0.04408	0.022611	-1.95	0.051	-0.08839	0.00024
_SG_5	-0.00755	0.022638	-0.33	0.739	-0.05192	0.03682
_SG_6	0.009818	0.022743	0.43	0.666	-0.03476	0.054394
_SG_7	-0.00357	0.022534	-0.16	0.874	-0.04773	0.0406
_SG_8	0.00105	0.022481	0.05	0.963	-0.04301	0.045111
_SG_9	-0.01731	0.022415	-0.77	0.44	-0.06125	0.026619
_SG_10	0.00947	0.022366	0.42	0.672	-0.03437	0.053306
_SG_11	0.00934	0.022312	0.42	0.676	-0.03439	0.05307
_SG_12	-0.00145	0.022123	-0.07	0.948	-0.04481	0.041912
_cons	-0.00828	0.01736	-0.48	0.633	-0.0423	0.025746

D_lkakinada

_ce1 L1	0.00146	0.042077	0.03	0.972	-0.08101	0.083929
_ce2 L1	0.027966	0.025692	1.09	0.276	-0.02239	0.078321
_ce3 L1	-0.3175	0.04349	-7.3	0	-0.40274	-0.23226
_ce4 L1	0.110251	0.045528	2.42	0.015	0.021017	0.199484
_ce5 L1	0.090642	0.027904	3.25	0.001	0.035951	0.145333
_ce6 L1	0.02239	0.039112	0.57	0.567	-0.05427	0.099049
_SG_2	0.032452	0.016766	1.94	0.053	-0.00041	0.065313
_SG_3	0.044275	0.016991	2.61	0.009	0.010973	0.077576
_SG_4	0.05519	0.017034	3.24	0.001	0.021804	0.088576
_SG_5	0.084349	0.017054	4.95	0	0.050924	0.117775
_SG_6	0.096162	0.017134	5.61	0	0.06258	0.129743
_SG_7	0.074542	0.016976	4.39	0	0.041271	0.107814
_SG_8	0.074656	0.016936	4.41	0	0.041463	0.107849
_SG_9	0.060635	0.016886	3.59	0	0.027538	0.093731
_SG_10	0.066563	0.016849	3.95	0	0.033539	0.099587
_SG_11	0.041093	0.016809	2.44	0.014	0.008149	0.074038
_SG_12	0.036225	0.016667	2.17	0.03	0.003559	0.06889
_cons	-0.02014	0.013078	-1.54	0.124	-0.04578	0.005491

D_lvijayawa

_ce1 L1	0.067723	0.038021	1.78	0.075	-0.0068	0.142243
_ce2 L1	0.02451	0.023215	1.06	0.291	-0.02099	0.070012
_ce3 L1	0.092063	0.039298	2.34	0.019	0.015041	0.169086
_ce4 L1	-0.27501	0.04114	-6.68	0	-0.35564	-0.19437
_ce5 L1	0.016889	0.025215	0.67	0.503	-0.03253	0.066308
_ce6 L1	-0.00306	0.035342	-0.09	0.931	-0.07233	0.066213
_SG_2	-0.01262	0.01515	-0.83	0.405	-0.04232	0.017072
_SG_3	0.021008	0.015353	1.37	0.171	-0.00908	0.0511
_SG_4	0.035566	0.015392	2.31	0.021	0.005398	0.065734
_SG_5	0.038709	0.01541	2.51	0.012	0.008505	0.068912
_SG_6	0.059149	0.015482	3.82	0	0.028805	0.089494
_SG_7	0.058572	0.015339	3.82	0	0.028507	0.088636
_SG_8	0.043515	0.015303	2.84	0.004	0.013521	0.073508
_SG_9	0.033178	0.015259	2.17	0.03	0.003272	0.063085
_SG_10	0.038362	0.015225	2.52	0.012	0.008522	0.068203
_SG_11	0.04817	0.015189	3.17	0.002	0.018401	0.077939
_SG_12	0.025365	0.01506	1.68	0.092	-0.00415	0.054882
_cons	-0.02352	0.011818	-1.99	0.047	-0.04668	-0.00035

D_lnizamabad

_ce1 L1	-0.03073	0.046229	-0.66	0.506	-0.12133	0.059882
_ce2 L1	0.012599	0.028227	0.45	0.655	-0.04273	0.067923
_ce3 L1	0.08164	0.047782	1.71	0.088	-0.01201	0.175291
_ce4 L1	0.069156	0.050021	1.38	0.167	-0.02888	0.167195
_ce5 L1	-0.14943	0.030658	-4.87	0	-0.20952	-0.08934
_ce6 L1	-0.00195	0.042972	-0.05	0.964	-0.08617	0.082279
_SG_2	0.02929	0.018421	1.59	0.112	-0.00681	0.065394
_SG_3	0.021368	0.018668	1.14	0.252	-0.01522	0.057956
_SG_4	0.029999	0.018715	1.6	0.109	-0.00668	0.066679
_SG_5	0.021415	0.018737	1.14	0.253	-0.01531	0.058139

_SG_6	0.040529	0.018825	2.15	0.031	0.003634	0.077425
_SG_7	0.027464	0.018651	1.47	0.141	-0.00909	0.06402
_SG_8	0.017923	0.018607	0.96	0.335	-0.01855	0.054392
_SG_9	0.020603	0.018553	1.11	0.267	-0.01576	0.056965
_SG_10	0.002907	0.018512	0.16	0.875	-0.03338	0.039189
_SG_11	-0.00607	0.018468	-0.33	0.742	-0.04227	0.030123
_SG_12	-0.01265	0.018311	-0.69	0.49	-0.04854	0.023235
_cons	-0.02512	0.014369	-1.75	0.08	-0.05328	0.003046
D_ltadepal~m						
_ce1 L1	-0.03279	0.043782	-0.75	0.454	-0.11861	0.053017
_ce2 L1	-0.03309	0.026733	-1.24	0.216	-0.08548	0.01931
_ce3 L1	0.021058	0.045253	0.47	0.642	-0.06764	0.109752
_ce4 L1	0.131177	0.047374	2.77	0.006	0.038326	0.224027
_ce5 L1	0.063005	0.029035	2.17	0.03	0.006097	0.119913
_ce6 L1	-0.32083	0.040698	-7.88	0	-0.40059	-0.24106
_SG_2	0.014485	0.017446	0.83	0.406	-0.01971	0.048678
_SG_3	0.02099	0.01768	1.19	0.235	-0.01366	0.055642
_SG_4	0.029589	0.017724	1.67	0.095	-0.00515	0.064328
_SG_5	0.046783	0.017745	2.64	0.008	0.012003	0.081564
_SG_6	0.067693	0.017828	3.8	0	0.032751	0.102636
_SG_7	0.038117	0.017664	2.16	0.031	0.003497	0.072737
_SG_8	0.051406	0.017622	2.92	0.004	0.016867	0.085945
_SG_9	0.030329	0.017571	1.73	0.084	-0.00411	0.064767
_SG_10	0.045408	0.017532	2.59	0.01	0.011046	0.07977
_SG_11	0.016004	0.01749	0.92	0.36	-0.01828	0.050284
_SG_12	0.008245	0.017342	0.48	0.634	-0.02574	0.042235
_cons	0.000281	0.013608	0.02	0.984	-0.02639	0.026953
D_lhyderabad						
_ce1 L1	0.327991	0.098183	3.34	0.001	0.135556	0.520425
_ce2 L1	0.190871	0.059949	3.18	0.001	0.073372	0.308369
_ce3 L1	0.045685	0.10148	0.45	0.653	-0.15321	0.244581
_ce4 L1	0.268743	0.106236	2.53	0.011	0.060525	0.476961
_ce5 L1	0.192248	0.065112	2.95	0.003	0.064632	0.319865
_ce6 L1	0.010619	0.091265	0.12	0.907	-0.16826	0.189495
_SG_2	0.023493	0.039122	0.6	0.548	-0.05319	0.100171
_SG_3	0.050603	0.039647	1.28	0.202	-0.0271	0.128309
_SG_4	0.056908	0.039747	1.43	0.152	-0.02099	0.134811
_SG_5	0.124178	0.039794	3.12	0.002	0.046183	0.202173
_SG_6	0.046369	0.03998	1.16	0.246	-0.03199	0.124729
_SG_7	0.036028	0.039611	0.91	0.363	-0.04161	0.113664
_SG_8	0.037457	0.039518	0.95	0.343	-0.04	0.11491
_SG_9	-0.00317	0.039402	-0.08	0.936	-0.0804	0.074058
_SG_10	-0.00802	0.039316	-0.2	0.838	-0.08507	0.069041
_SG_11	0.01596	0.039222	0.41	0.684	-0.06091	0.092833
_SG_12	0.003077	0.03889	0.08	0.937	-0.07315	0.079299
_cons	-0.00398	0.030517	-0.13	0.896	-0.06379	0.055832

Common Factor 2

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
D_ltrivand~m						
_ce1 L1	-0.06594	0.021288	-3.1	0.002	-0.10766	-0.02421
_ce2 L1	0.027998	0.025662	1.09	0.275	-0.0223	0.078295
_SG_2	-0.00374	0.010894	-0.34	0.732	-0.02509	0.017615
_SG_3	-0.01268	0.010902	-1.16	0.245	-0.03405	0.008684
_SG_4	-0.01194	0.010894	-1.1	0.273	-0.03329	0.009413
_SG_5	-0.01339	0.01089	-1.23	0.219	-0.03473	0.007955
_SG_6	-0.01327	0.010892	-1.22	0.223	-0.03462	0.008076
_SG_7	-0.00053	0.010903	-0.05	0.961	-0.0219	0.020838
_SG_8	-0.01413	0.010905	-1.3	0.195	-0.03551	0.007241
_SG_9	-0.01408	0.010915	-1.29	0.197	-0.03547	0.007313
_SG_10	0.006697	0.010962	0.61	0.541	-0.01479	0.028182
_SG_11	0.002009	0.010927	0.18	0.854	-0.01941	0.023426
_SG_12	-0.01317	0.010894	-1.21	0.227	-0.03452	0.00818
_cons	0.008533	0.007909	1.08	0.281	-0.00697	0.024034
D_lgauhati						
_ce1 L1	0.171696	0.033493	5.13	0	0.106052	0.23734
_ce2 L1	-0.3332	0.040374	-8.25	0	-0.41233	-0.25407
_SG_2	-0.00229	0.017139	-0.13	0.894	-0.03589	0.031299
_SG_3	0.01167	0.017153	0.68	0.496	-0.02195	0.045289
_SG_4	0.024073	0.01714	1.4	0.16	-0.00952	0.057667
_SG_5	-0.00651	0.017133	-0.38	0.704	-0.04009	0.02707
_SG_6	0.038631	0.017137	2.25	0.024	0.005044	0.072218
_SG_7	0.02285	0.017154	1.33	0.183	-0.01077	0.05647
_SG_8	0.024799	0.017157	1.45	0.148	-0.00883	0.058426
_SG_9	0.0332	0.017173	1.93	0.053	-0.00046	0.066859
_SG_10	0.017517	0.017246	1.02	0.31	-0.01629	0.051319
_SG_11	0.01045	0.017191	0.61	0.543	-0.02324	0.044144
_SG_12	-0.0049	0.01714	-0.29	0.775	-0.0385	0.028689
_cons	0.000664	0.012443	0.05	0.957	-0.02372	0.025052
D_lamritsar						
_ce1 L1	-0.09574	0.028972	-3.3	0.001	-0.15252	-0.03895
_ce2 L1	0.003797	0.034925	0.11	0.913	-0.06466	0.072249
_SG_2	-0.00276	0.014826	-0.19	0.852	-0.03182	0.026297
_SG_3	0.015963	0.014838	1.08	0.282	-0.01312	0.045044
_SG_4	0.009069	0.014827	0.61	0.541	-0.01999	0.038129
_SG_5	0.005135	0.014821	0.35	0.729	-0.02391	0.034183
_SG_6	0.012207	0.014824	0.82	0.41	-0.01685	0.041262
_SG_7	-0.00128	0.014839	-0.09	0.931	-0.03037	0.027798
_SG_8	0.016268	0.014842	1.1	0.273	-0.01282	0.045357
_SG_9	-0.00993	0.014856	-0.67	0.504	-0.03905	0.019184
_SG_10	-0.0142	0.014919	-0.95	0.341	-0.04344	0.015043
_SG_11	0.022947	0.014871	1.54	0.123	-0.0062	0.052093
_SG_12	0.002965	0.014827	0.2	0.842	-0.02609	0.032025
_cons	-0.00469	0.010764	-0.44	0.663	-0.02578	0.01641

Common Factor 3

	Coef.	*Std. Err.*	*z*	*P>|z|*	*[95% Conf.*	*Interval]*
D_lgauhati						
_ce1 L1	-0.36488	0.041546	-8.78	0	-0.44631	-0.28345
_ce2 L1	0.004784	0.040693	0.12	0.906	-0.07497	0.08454
_SG_2	-0.00397	0.016958	-0.23	0.815	-0.0372	0.02927
_SG_3	0.009393	0.016981	0.55	0.58	-0.02389	0.042674
_SG_4	0.020381	0.016969	1.2	0.23	-0.01288	0.053639
_SG_5	-0.01057	0.016946	-0.62	0.533	-0.04378	0.022644
_SG_6	0.033069	0.016976	1.95	0.051	-0.0002	0.066341
_SG_7	0.017118	0.016945	1.01	0.312	-0.01609	0.050329
_SG_8	0.020972	0.01695	1.24	0.216	-0.01225	0.054193
_SG_9	0.028844	0.016967	1.7	0.089	-0.00441	0.062098
_SG_10	0.010454	0.017004	0.61	0.539	-0.02287	0.04378
_SG_11	0.006203	0.016969	0.37	0.715	-0.02706	0.039462
_SG_12	-0.00471	0.016956	-0.28	0.781	-0.03794	0.02852
_cons	-0.0013	0.013112	-0.1	0.921	-0.027	0.024397
D_ltihu						
_ce1 L1	0.003045	0.02632	0.12	0.908	-0.04854	0.054631
_ce2 L1	-0.06423	0.025779	-2.49	0.013	-0.11475	-0.0137
_SG_2	-0.0172	0.010743	-1.6	0.109	-0.03826	0.003852
_SG_3	-0.01576	0.010757	-1.47	0.143	-0.03685	0.005319
_SG_4	-0.02467	0.01075	-2.29	0.022	-0.04573	-0.0036
_SG_5	-0.02181	0.010735	-2.03	0.042	-0.04285	-0.00077
_SG_6	-0.01164	0.010754	-1.08	0.279	-0.03272	0.009435
_SG_7	-0.02599	0.010734	-2.42	0.015	-0.04703	-0.00495
_SG_8	-0.03186	0.010738	-2.97	0.003	-0.0529	-0.01081
_SG_9	-0.02366	0.010748	-2.2	0.028	-0.04472	-0.00259
_SG_10	-0.02059	0.010772	-1.91	0.056	-0.0417	0.000522
_SG_11	-0.0299	0.01075	-2.78	0.005	-0.05097	-0.00883
_SG_12	-0.01865	0.010741	-1.74	0.083	-0.0397	0.002407
_cons	0.034029	0.008307	4.1	0	0.017749	0.050309
D_lhailkandi						
_ce1 L1	-0.02989	0.037579	-0.8	0.426	-0.10354	0.043765
_ce2 L1	0.113228	0.036807	3.08	0.002	0.041088	0.185368
_SG_2	-0.02608	0.015339	-1.7	0.089	-0.05614	0.003982
_SG_3	-0.01288	0.015359	-0.84	0.402	-0.04298	0.017223
_SG_4	-0.02448	0.015348	-1.59	0.111	-0.05456	0.005607
_SG_5	-0.02832	0.015328	-1.85	0.065	-0.05836	0.001722
_SG_6	-0.02007	0.015355	-1.31	0.191	-0.05017	0.010024
_SG_7	-0.0365	0.015327	-2.38	0.017	-0.06654	-0.00646
_SG_8	-0.02013	0.015331	-1.31	0.189	-0.05018	0.009918
_SG_9	-0.01356	0.015346	-0.88	0.377	-0.04364	0.016518
_SG_10	-0.04118	0.01538	-2.68	0.007	-0.07132	-0.01103
_SG_11	-0.04078	0.015349	-2.66	0.008	-0.07086	-0.0107
_SG_12	-0.05236	0.015336	-3.41	0.001	-0.08242	-0.0223
_cons	0.019357	0.01186	1.63	0.103	-0.00389	0.042602

Common Factor 4

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
D_lkakinada						
_ce1 L1	-0.25025	0.035253	-7.1	0	-0.31935	-0.18116
_ce2 L1	0.0328	0.050311	0.65	0.514	-0.06581	0.131407
_ce3 L1	0.067902	0.040173	1.69	0.091	-0.01084	0.146639
_ce4 L1	0.049132	0.038232	1.29	0.199	-0.0258	0.124065
_SG_2	0.032861	0.017006	1.93	0.053	-0.00047	0.066193
_SG_3	0.039352	0.017218	2.29	0.022	0.005605	0.073099
_SG_4	0.045042	0.017206	2.62	0.009	0.011318	0.078766
_SG_5	0.066554	0.017399	3.83	0	0.032452	0.100657
_SG_6	0.074308	0.017455	4.26	0	0.040097	0.108519
_SG_7	0.055277	0.017561	3.15	0.002	0.020858	0.089695
_SG_8	0.054635	0.017431	3.13	0.002	0.020471	0.088799
_SG_9	0.03647	0.017147	2.13	0.033	0.002863	0.070078
_SG_10	0.044621	0.017095	2.61	0.009	0.011116	0.078126
_SG_11	0.024127	0.017163	1.41	0.16	-0.00951	0.057766
_SG_12	0.030929	0.01677	1.84	0.065	-0.00194	0.063797
_cons	-0.00702	0.014974	-0.47	0.639	-0.03637	0.022328
D_lsambalpur						
_ce1 L1	0.053784	0.02769	1.94	0.052	-0.00049	0.108055
_ce2 L1	-0.24499	0.039517	-6.2	0	-0.32245	-0.16754
_ce3 L1	0.083807	0.031554	2.66	0.008	0.021962	0.145651
_ce4 L1	0.035508	0.030029	1.18	0.237	-0.02335	0.094365
_SG_2	0.028919	0.013358	2.16	0.03	0.002739	0.0551
_SG_3	0.008581	0.013524	0.63	0.526	-0.01793	0.035087
_SG_4	0.016751	0.013515	1.24	0.215	-0.00974	0.043239
_SG_5	-0.02186	0.013666	-1.6	0.11	-0.04865	0.004925
_SG_6	-0.01447	0.01371	-1.06	0.291	-0.04134	0.012405
_SG_7	0.019379	0.013793	1.4	0.16	-0.00765	0.046413
_SG_8	0.015521	0.013691	1.13	0.257	-0.01131	0.042355
_SG_9	-0.02577	0.013468	-1.91	0.056	-0.05216	0.000632
_SG_10	-0.04626	0.013427	-3.45	0.001	-0.07258	-0.01995
_SG_11	-0.03419	0.013481	-2.54	0.011	-0.06061	-0.00777
_SG_12	-0.02254	0.013172	-1.71	0.087	-0.04836	0.003272
_cons	-0.01095	0.011761	-0.93	0.352	-0.034	0.012098
D_lbalasore						
_ce1 L1	0.006737	0.034948	0.19	0.847	-0.06176	0.075233
_ce2 L1	0.028341	0.049875	0.57	0.57	-0.06941	0.126094
_ce3 L1	-0.17036	0.039825	-4.28	0	-0.24842	-0.09231
_ce4 L1	0.06834	0.0379	1.8	0.071	-0.00594	0.142624
_SG_2	0.042418	0.016859	2.52	0.012	0.009375	0.075461
_SG_3	0.057624	0.017069	3.38	0.001	0.02417	0.091078
_SG_4	0.104354	0.017057	6.12	0	0.070923	0.137786
_SG_5	0.083294	0.017249	4.83	0	0.049487	0.1171

_SG_6	0.063327	0.017303	3.66	0	0.029413	0.097241
_SG_7	0.081455	0.017408	4.68	0	0.047335	0.115575
_SG_8	0.073703	0.01728	4.27	0	0.039836	0.107571
_SG_9	0.028743	0.016998	1.69	0.091	-0.00457	0.062059
_SG_10	0.038835	0.016947	2.29	0.022	0.00562	0.072049
_SG_11	-0.01473	0.017014	-0.87	0.387	-0.04808	0.018619
_SG_12	0.001007	0.016624	0.06	0.952	-0.03158	0.03359
_cons	-0.01703	0.014844	-1.15	0.251	-0.04612	0.012065

D_ljeypore

_ce1 L1	0.101463	0.034249	2.96	0.003	0.034335	0.16859
_ce2 L1	0.120424	0.048878	2.46	0.014	0.024625	0.216224
_ce3 L1	-0.02006	0.039029	-0.51	0.607	-0.09656	0.056431
_ce4 L1	-0.27029	0.037143	-7.28	0	-0.34309	-0.19749
_SG_2	-0.0084	0.016522	-0.51	0.611	-0.04079	0.023979
_SG_3	-0.00109	0.016728	-0.06	0.948	-0.03387	0.031699
_SG_4	0.026772	0.016716	1.6	0.109	-0.00599	0.059536
_SG_5	0.021491	0.016904	1.27	0.204	-0.01164	0.054622
_SG_6	0.015503	0.016958	0.91	0.361	-0.01773	0.04874
_SG_7	0.002772	0.017061	0.16	0.871	-0.03067	0.03621
_SG_8	0.001465	0.016935	0.09	0.931	-0.03173	0.034656
_SG_9	-0.01096	0.016659	-0.66	0.51	-0.04361	0.021688
_SG_10	-0.03684	0.016608	-2.22	0.027	-0.06939	-0.00429
_SG_11	-0.09219	0.016675	-5.53	0	-0.12487	-0.0595
_SG_12	-0.05729	0.016292	-3.52	0	-0.08922	-0.02536
_cons	-0.00907	0.014547	-0.62	0.533	-0.03758	0.019446

D_lcuttack

_ce1 L1	0.012484	0.025595	0.49	0.626	-0.03768	0.062648
_ce2 L1	0.08245	0.036527	2.26	0.024	0.01086	0.154041
_ce3 L1	0.158395	0.029166	5.43	0	0.101231	0.21556
_ce4 L1	0.05188	0.027757	1.87	0.062	-0.00252	0.106282
_SG_2	-0.00071	0.012347	-0.06	0.954	-0.02491	0.023492
_SG_3	0.019085	0.012501	1.53	0.127	-0.00542	0.043586
_SG_4	0.02996	0.012492	2.4	0.016	0.005476	0.054444
_SG_5	0.026506	0.012632	2.1	0.036	0.001747	0.051265
_SG_6	0.003184	0.012673	0.25	0.802	-0.02165	0.028021
_SG_7	0.017378	0.012749	1.36	0.173	-0.00761	0.042367
_SG_8	0.043722	0.012655	3.45	0.001	0.018919	0.068526
_SG_9	0.003415	0.012449	0.27	0.784	-0.02099	0.027814
_SG_10	-0.02264	0.012411	-1.82	0.068	-0.04696	0.001687
_SG_11	-0.00932	0.012461	-0.75	0.454	-0.03374	0.015102
_SG_12	-0.02308	0.012175	-1.9	0.058	-0.04694	0.000783
_cons	-0.01066	0.010871	-0.98	0.327	-0.03197	0.010649

Common Factor 5

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
D_lranchi						
_ce1 L1	-0.2124	0.046083	-4.61	0	-0.30272	-0.12208
_ce2 L1	0.063772	0.038538	1.65	0.098	-0.01176	0.139304
_ce3 L1	0.09095	0.034615	2.63	0.009	0.023105	0.158795
_ce4 L1	0.050018	0.042241	1.18	0.236	-0.03277	0.132809
_SG_2	-0.00333	0.014357	-0.23	0.817	-0.03146	0.024814
_SG_3	0.01059	0.014346	0.74	0.46	-0.01753	0.038707
_SG_4	0.013441	0.014405	0.93	0.351	-0.01479	0.041675
_SG_5	0.009293	0.014415	0.64	0.519	-0.01896	0.037546
_SG_6	0.002001	0.014447	0.14	0.89	-0.02631	0.030315
_SG_7	0.020837	0.014494	1.44	0.151	-0.00757	0.049245
_SG_8	-0.0142	0.014534	-0.98	0.328	-0.04269	0.014283
_SG_9	-0.03367	0.014425	-2.33	0.02	-0.06194	-0.0054
_SG_10	-0.05031	0.014455	-3.48	0.001	-0.07864	-0.02198
_SG_11	-0.06302	0.014462	-4.36	0	-0.09136	-0.03467
_SG_12	-0.02961	0.014439	-2.05	0.04	-0.05791	-0.00131
_cons	0.034871	0.01108	3.15	0.002	0.013156	0.056587
D_ldumka						
_ce1 L1	0.224983	0.060603	3.71	0	0.106203	0.343762
_ce2 L1	-0.51511	0.05068	-10.16	0	-0.61444	-0.41578
_ce3 L1	0.000904	0.045521	0.02	0.984	-0.08832	0.090124
_ce4 L1	0.15543	0.05555	2.8	0.005	0.046554	0.264306
_SG_2	0.000361	0.01888	0.02	0.985	-0.03664	0.037366
_SG_3	0.008259	0.018866	0.44	0.662	-0.02872	0.045236
_SG_4	0.020984	0.018944	1.11	0.268	-0.01615	0.058114
_SG_5	0.010344	0.018957	0.55	0.585	-0.02681	0.047499
_SG_6	-0.02139	0.018998	-1.13	0.26	-0.05862	0.015848
_SG_7	0.003031	0.019061	0.16	0.874	-0.03433	0.040389
_SG_8	-0.00588	0.019113	-0.31	0.758	-0.04334	0.031581
_SG_9	0.001418	0.01897	0.07	0.94	-0.03576	0.038597
_SG_10	-0.03294	0.01901	-1.73	0.083	-0.0702	0.00432
_SG_11	-0.05126	0.019019	-2.7	0.007	-0.08854	-0.01398
_SG_12	-0.03111	0.018988	-1.64	0.101	-0.06832	0.006107
_cons	0.004899	0.01457	0.34	0.737	-0.02366	0.033456
D_larrah						
_ce1 L1	0.182944	0.055294	3.31	0.001	0.074569	0.291319
_ce2 L1	-0.03542	0.04624	-0.77	0.444	-0.12605	0.055209
_ce3 L1	-0.26108	0.041534	-6.29	0	-0.34249	-0.17968
_ce4 L1	0.150618	0.050684	2.97	0.003	0.051278	0.249957
_SG_2	-0.03796	0.017227	-2.2	0.028	-0.07172	-0.00419
_SG_3	-0.02649	0.017213	-1.54	0.124	-0.06022	0.007252
_SG_4	-0.03233	0.017285	-1.87	0.061	-0.0662	0.001552

_SG_5	-0.01263	0.017297	-0.73	0.465	-0.04653	0.021273
_SG_6	-0.01502	0.017334	-0.87	0.386	-0.049	0.018952
_SG_7	-0.0171	0.017391	-0.98	0.326	-0.05118	0.016991
_SG_8	-0.05139	0.017439	-2.95	0.003	-0.08557	-0.01721
_SG_9	-0.04958	0.017308	-2.86	0.004	-0.08351	-0.01566
_SG_10	-0.0485	0.017345	-2.8	0.005	-0.0825	-0.01451
_SG_11	-0.07674	0.017353	-4.42	0	-0.11075	-0.04273
_SG_12	-0.1091	0.017325	-6.3	0	-0.14305	-0.07514
_cons	0.016264	0.013294	1.22	0.221	-0.00979	0.04232
D_lpatna						
_ce1 L1	0.187685	0.048271	3.89	0	0.093076	0.282295
_ce2 L1	0.04508	0.040367	1.12	0.264	-0.03404	0.124198
_ce3 L1	0.066197	0.036258	1.83	0.068	-0.00487	0.137262
_ce4 L1	-0.34178	0.044247	-7.72	0	-0.4285	-0.25505
_SG_2	-0.00959	0.015039	-0.64	0.524	-0.03906	0.019887
_SG_3	-0.01908	0.015027	-1.27	0.204	-0.04853	0.010372
_SG_4	0.001418	0.015089	0.09	0.925	-0.02816	0.030993
_SG_5	-0.00034	0.0151	-0.02	0.982	-0.02993	0.029255
_SG_6	0.000314	0.015132	0.02	0.983	-0.02934	0.029973
_SG_7	0.028964	0.015182	1.91	0.056	-0.00079	0.058721
_SG_8	-0.02017	0.015224	-1.33	0.185	-0.05001	0.009666
_SG_9	-0.02599	0.01511	-1.72	0.085	-0.05561	0.003622
_SG_10	-0.03465	0.015142	-2.29	0.022	-0.06433	-0.00498
_SG_11	-0.03852	0.015149	-2.54	0.011	-0.06821	-0.00883
_SG_12	-0.05696	0.015124	-3.77	0	-0.0866	-0.02732
_cons	0.014759	0.011606	1.27	0.203	-0.00799	0.037505
D_ljamshed~r						
_ce1 L1	0.165761	0.040131	4.13	0	0.087107	0.244415
_ce2 L1	0.062379	0.03356	1.86	0.063	-0.0034	0.128154
_ce3 L1	0.027672	0.030144	0.92	0.359	-0.03141	0.086753
_ce4 L1	0.02636	0.036785	0.72	0.474	-0.04574	0.098456
_SG_2	-0.00496	0.012502	-0.4	0.691	-0.02947	0.019542
_SG_3	-0.00579	0.012493	-0.46	0.643	-0.03027	0.018697
_SG_4	0.002482	0.012545	0.2	0.843	-0.02211	0.027069
_SG_5	-0.00236	0.012553	-0.19	0.851	-0.02697	0.022242
_SG_6	-0.00858	0.012581	-0.68	0.495	-0.03323	0.016081
_SG_7	0.009418	0.012622	0.75	0.456	-0.01532	0.034156
_SG_8	-0.00815	0.012656	-0.64	0.519	-0.03296	0.016653
_SG_9	-0.02441	0.012561	-1.94	0.052	-0.04903	0.000209
_SG_10	-0.0338	0.012588	-2.69	0.007	-0.05848	-0.00913
_SG_11	-0.03423	0.012594	-2.72	0.007	-0.05892	-0.00955
_SG_12	-0.02813	0.012574	-2.24	0.025	-0.05277	-0.00348
_cons	0.003373	0.009648	0.35	0.727	-0.01554	0.022283

Table A.2 Normalized Cointegrating Vectors

Common Factor 1

Beta	*Coef.*	*Std. Err.*	*z*	*P>|z|*	*[95% Conf.*	*Interval]*
_ce1						
lbangalore	1	.	.	.	.	.
Lnellore	(dropped)					
Lkakinada	4.16E-17	.	.	.	.	.
Lvijayawa	-2.78E-17	.	.	.	.	.
lnizamabad	8.33E-17	.	.	.	.	.
ltadepalli~m	-2.78E-17	.	.	.	.	.
lhyderabad	-0.6417	0.056212	-11.42	0	-0.75187	-0.53153
_trend	-0.00309	0.000358	-8.63	0	-0.00379	-0.00239
_cons	-1.91145	.	.	.	.	.
_ce2						
lbangalore	(dropped)					
Lnellore	1	.	.	.	.	.
Lkakinada	-2.78E-17	.	.	.	.	.
Lvijayawa	(dropped)					
lnizamabad	2.78E-17	.	.	.	.	.
ltadepalli~m	-1.39E-17	.	.	.	.	.
lhyderabad	-0.90017	0.094355	-9.54	0	-1.0851	-0.71524
_trend	-0.00159	0.000601	-2.65	0.008	-0.00277	-0.00042
_cons	-0.55525	.	.	.	.	.
_ce3						
lbangalore	2.78E-17	.	.	.	.	.
Lnellore	-1.39E-17	.	.	.	.	.
Lkakinada	1	.	.	.	.	.
Lvijayawa	5.55E-17	.	.	.	.	.
lnizamabad	-2.43E-17	.	.	.	.	.
ltadepalli~m	2.60E-17	.	.	.	.	.
lhyderabad	-0.69827	0.051226	-13.63	0	-0.79867	-0.59787
_trend	-0.00205	0.000326	-6.3	0	-0.00269	-0.00141
_cons	-1.25407	.	.	.	.	.
_ce4						
lbangalore	1.39E-17	.	.	.	.	.
Lnellore	-3.47E-17	.	.	.	.	.
Lkakinada	2.26E-17	.	.	.	.	.
Lvijayawa	1	.	.	.	.	.
lnizamabad	2.08E-17	.	.	.	.	.
ltadepalli~m	2.60E-17	.	.	.	.	.
lhyderabad	-0.71638	0.046047	-15.56	0	-0.80664	-0.62613
_trend	-0.00217	0.000293	-7.4	0	-0.00274	-0.0016
_cons	-1.1758	.	.	.	.	.

_ce5						
lbangalore	-5.55E-17	.	.	.	.	.
Lnellore	-8.33E-17	.	.	.	.	.
Lkakinada	6.25E-17	.	.	.	.	.
Lvijayawa	-5.55E-17	.	.	.	.	.
lnizamabad	1	.	.	.	.	.
ltadepalli~m	-3.47E-17	.	.	.	.	.
lhyderabad	-0.94266	0.086466	-10.9	0	-1.11213	-0.77319
_trend	-0.00071	0.000551	-1.29	0.197	-0.00179	0.000369
_cons	-0.22112	.	.	.	.	.
_ce6						
lbangalore	-3.12E-17	.	.	.	.	.
Lnellore	1.56E-17	.	.	.	.	.
Lkakinada	6.51E-18	.	.	.	.	.
Lvijayawa	-2.34E-17	.	.	.	.	.
lnizamabad	-4.42E-17	.	.	.	.	.
ltadepalli~m	1	.	.	.	.	.
lhyderabad	-0.56155	0.057106	-9.83	0	-0.67347	-0.44962
_trend	-0.00337	0.000364	-9.28	0	-0.00409	-0.00266

Common Factor 2

beta	*Coef.*	*Std. Err.*	*z*	*P>|z|*	*[95% Conf.*	*Interval]*
_ce1						
ltrivandrum	1	.	.	.	.	.
lgauhati	(dropped)					
lamritsar	0.964187	0.171391	5.63	0	0.628266	1.300109
_trend	-0.01476	0.001661	-8.89	0	-0.01802	-0.01151
_cons	-9.23144	.	.	.	.	.
_ce2						
ltrivandrum	(dropped)					
lgauhati	1	.	.	.	.	.
lamritsar	0.28032	0.122416	2.29	0.022	0.040388	0.520251
_trend	-0.00924	0.001187	-7.79	0	-0.01157	-0.00692
_cons	-5.96442	.	.	.	.	.

Common Factor 3

beta	*Coef.*	*Std. Err.*	*z*	*P>|z|*	*[95% Conf.*	*Interval]*
_ce1						
lgauhati	1	.	.	.	.	.
ltihu	(dropped)					
lhailkandi	-0.24938	0.038286	-6.51	0	-0.32442	-0.17434
_trend	-0.00494	0.00026	-18.98	0	-0.00545	-0.00443
_cons	-3.46443	.	.	.	.	.
_ce2						
lgauhati	(dropped)					
ltihu	1	.	.	.	.	.
lhailkandi	-0.60799	0.071267	-8.53	0	-0.74767	-0.46831
_trend	-0.00171	0.000484	-3.52	0	-0.00266	-0.00076
_cons	-1.63442	.	.	.	.	.

Common Factor 4

beta	*Coef.*	*Std. Err.*	*z*	*P>|z|*	*[95% Conf.*	*Interval]*
_ce1						
lkakinada	1	.	.	.	.	.
lsambalpur	-6.94E-17	.	.	.	.	.
lbalasore	-5.55E-17	.	.	.	.	.
ljeypore	5.55E-17	.	.	.	.	.
lcuttack	-0.79753	0.097563	-8.17	0	-0.98875	-0.60631
_trend	-0.00189	0.000549	-3.44	0.001	-0.00297	-0.00081
_cons	-0.66462	.	.	.	.	.
_ce2						
lkakinada	2.78E-17	.	.	.	.	.
lsambalpur	1	.	.	.	.	.
lbalasore	(dropped)					
ljeypore	5.55E-17	.	.	.	.	.
lcuttack	-0.86026	0.067709	-12.71	0	-0.99296	-0.72755
_trend	-0.00145	0.000381	-3.81	0	-0.0022	-0.00071
_cons	-0.57217	.	.	.	.	.
_ce3						
lkakinada	5.55E-17	.	.	.	.	.
lsambalpur	-2.78E-17	.	.	.	.	.
lbalasore	1	.	.	.	.	.
ljeypore	-5.55E-17	.	.	.	.	.
lcuttack	-0.94464	0.06789	-13.91	0	-1.0777	-0.81157
_trend	-0.00055	0.000382	-1.44	0.15	-0.0013	0.000199
_cons	-0.05158	.	.	.	.	.
_ce4						
lkakinada	-5.55E-17	.	.	.	.	.
lsambalpur	2.78E-17	.	.	.	.	.
lbalasore	1.11E-16	.	.	.	.	.
ljeypore	1	.	.	.	.	.
lcuttack	-0.82956	0.08966	-9.25	0	-1.00529	-0.65383
_trend	-0.00139	0.000504	-2.76	0.006	-0.00238	-0.0004
_cons	-0.64711	.	.	.	.	.

Common Factor 5

beta	*Coef.*	*Std. Err.*	*z*	*P>|z|*	*[95% Conf.*	*Interval]*
_ce1						
lranchi	1	.	.	.	.	.
ldumka	(dropped)					
larrah	5.55E-17	.	.	.	.	.
lpatna	6.94E-17	.	.	.	.	.
ljamshedpur	-1.03427	0.060535	-17.09	0	-1.15291	-0.91562
_trend	-0.00013	0.000321	-0.4	0.687	-0.00076	0.0005
_cons	0.313461	.	.	.	.	.
_ce2						
lranchi	1.67E-16	.	.	.	.	.
ldumka	1	.	.	.	.	.
larrah	(dropped)					
lpatna	-6.94E-17	.	.	.	.	.
ljamshedpur	-0.89026	0.053729	-16.57	0	-0.99556	-0.78495
_trend	-0.00076	0.000285	-2.65	0.008	-0.00132	-0.0002
_cons	-0.48558	.	.	.	.	.
_ce3						
lranchi	1.39E-17	.	.	.	.	.
ldumka	(dropped)					
larrah	1	.	.	.	.	.
lpatna	-2.78E-17	.	.	.	.	.
ljamshedpur	-1.00893	0.09381	-10.75	0	-1.19279	-0.82506
_trend	1.38E-05	0.000498	0.03	0.978	-0.00096	0.000989
_cons	0.098778	.	.	.	.	.
_ce4						
lranchi	9.71E-17	.	.	.	.	.
ldumka	2.78E-17	.	.	.	.	.
larrah	(dropped)					
lpatna	1	.	.	.	.	.
ljamshedpur	-0.91636	0.071726	-12.78	0	-1.05694	-0.77578
_trend	-0.00048	0.000381	-1.26	0.207	-0.00123	0.000266
_cons	-0.3834	.	.	.	.	.