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INCREASED EXPOSURE OF CHINA TO ASYMMETRIC EXTERNAL SHOCKS: IS FISCAL FEDERALISM AN EFFICIENT ANSWER?

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Abstract:

The aim of this paper is to examine whether there is a co-insurance mechanism against provincial aggregate income fluctuations between the Chinese provinces. Our theoretical argument relies on the existence of an efficient allocation of risk between the Chinese provinces. According to this analysis, an institutional arrangement between the provinces allows the perfect smoothing of provincial private consumption. In this case, changes in provincial private consumption depend rather on changes in aggregate Chinese income than on asymmetric changes in provincial income. We test this hypothesis on the 1989-2000 period for 30 Chinese provinces using the GMM estimator. Econometric evidence highlights the weakness of co-insurance mechanisms between the Chinese provinces. First, we reject the hypothesis of perfect insurance. Second, there does not seem to exist a significant, though imperfect, insurance mechanism. Indeed, the provinces' private consumption reactions are the same either after a shock affecting all the provinces or after an asymmetric shock.

Keywords: Co-insurance, Regional Economics Risk Coping, Fiscal Federalism, China.

JEL Classification: E62, H31, H7, R11

1 - Introduction

China's fiscal system is highly decentralised due to History and to the size of the country (Dulbecco & Renard, 2002). Today, sub-National governments represent more than 70% of total budgetary expenditures. Local and particularly provincial governments have thus a true autonomy in their economic action despite a strong political centralisation. Many observers consider that China's economy operates much like a federal system (World Bank, 2002).

Central-province fiscal relationships have moved through three stages (*e.g* Knight & Li, 1999). Before 1978, the provincial governments collected revenues and handed them over to the Central Government, in accordance with the Plan. At that time, there did not exist provincial objective functions: provincial governments acted as agents of the Central Government.

The transition to a market economy has begun in the second stage (1978-1994). This stage was mainly characterised by a strong decentralisation in tax collection and in expenditure assignments. For instance, the share of the tax and non tax income collected by the Central Government felt sharply from 40.5% in 1984 to 22% in 1993 (Annual Statistical Yearbook, 2001). Local governments acquired enough autonomy to pursue their objectives through the so-called "revenue-contracting system". However, these fiscal contracts were very different between the provinces so that the system was neither efficient nor equitable, notably in the case of provincial asymmetric shocks.

The reform of 1994 implemented re-centralisation of revenues. Revenue assignments have been structured according to the "Tax Sharing System". The latter raises the share of local expenditures financed by central transfers while leaving provincial expenditures responsibilities unchanged. During this period, the revenues accruing to the Central Government have risen from 49% to 56% of total revenues. Local governments are allowed to collect only the taxes defined as being local. This institutional evolution has increased capacity of the Central Government to conduct its own policy. The question is whether this

reform favours the inter-provincial stabilisation of revenues in a similar way as an inter-provincial co-insurance mechanism.

This paper tests the existence of a mutual insurance between provinces in China. The rest of the paper is organised as follows. In the second section, we first expose the arguments according to which inter-provincial grants can be interpreted as a risk sharing contracts that provide insurance against provincial income fluctuations. Second, we develop a model of fiscal federalism where a benevolent planner maximises the welfare of risk adverse representative provincial households. In the third section, the model is tested with time series provincial data on consumption and income. This panel dimension allows distinguishing between idiosyncratic shocks (insurable) and co-variant ones (uninsurable).

2 - Protection against income fluctuations in China.

The Chinese reforms are intended to promote market mechanisms. In a market economy, the households should be able to shield their own consumption from income fluctuations. Insurance markets theoretically provide income insurance or households can engage in risk coping activities. Market failures as well as enforcement problems or restrictions to inner migrations may however justify a public intervention. The latter can be achieved by inter-provincial stabilisation corresponding to the traditional aims of fiscal federalism.

a - Private insurance and fiscal federalism against income fluctuations.

Risk adverse households and especially the poorest do not accept that their consumption fluctuates along with their income. Under insurance and credit markets failures, households cope with risk in various ways. Avoiding consumption fluctuations despite income variability[2] can be achieved when the household smoothes its own consumption either

[2] We only consider risk-coping behaviours where the objective is to mitigate consumption fluctuations *i.e.* to secure consumption under the hypothesis of exogenous incomes. We do not address strategies that bring a reduction in income risk that can be achieved through income diversification. The latter strategies are commonly labelled risk coping (Alderman & Paxson, 1992). Migration can be seen as a risk management option in the sense that households try to mitigate their income risk.

relying to saving or to sharing risk. In the former, it is an autarkic solution, in the latter it is an inter-individual insurance strategy.

Consumption smoothing and life cycle accumulation traditionally motivate saving. In a risky environment, there is however an additional motive related to specific *i.e.* precautionary saving intended to compensate for the realisation of unexpected income fluctuations. In this context, prudent households accumulate assets considered as a precautionary buffer stock (*e.g.* Kimball 1990, Deaton 1992, Rosenzweig & Wolpin, 1993). The latter is depleted after the occurrence of a negative income shock. Several problems arise however with this strategy. Holding unproductive liquid assets can impede productive investments.[3] Moreover, several analyses suggest that the availability of buffer stock does not guarantee a smooth consumption pattern[4]. For instance, households that run out of buffer stock may become more vulnerable to repeated future negative shocks. When productive assets (*e.g.* livestock) constitute buffer stocks, household may prefer to reduce consumption rather than deplete their buffer. When there is a too large amount of buffer stock for sale, assets prices may collapse that is detrimental to the achievement of insurance objectives. More generally, this autarkic strategy is welfare costly and especially for the poorest.

Households may share the risk within a community that can be villages, families, ethnic groups as well as *ad hoc* solidarity networks (Cochrane, 1991, Mace, 1991, Udry, 1994, Townsend, 1995, Grimard, 1997, Ogaki et Zhang, 2001 *etc.*). The risk-sharing group allows theoretically a perfect allocation of resources within the group *i.e.* perfect insurance. The evidence suggests however only what is usually labelled as partial insurance. For example, Jalan and Ravallion (1999) reject the full insurance hypothesis for a panel of households in rural China and find evidence of partial insurance. This result may be explained by enforcement and information problems that make opportunistic behaviours more profitable. In one case, *ex ante* moral hazard may appear when households are incited to engage in risky activities they would not take in without insurance. In another case, the unobservable character of income losses within the group may cause *ex post* moral hazard.

[3] Jalan and Ravallion (2001) study the consequences of eliminating income risk on the share of household wealth held in unproductive liquid assets in rural China.

[4] See for example Hoogeveen (2001) for a recent survey of household strategies against income risk.

Neither inter-individual nor inter-temporal consumption smoothing do effectively protect against consumption fluctuations. Hence, this failure can advocate for fiscal co-insurance between the Chinese provinces in order to smooth provincial asymmetric disturbances. In this case the central government budget acts like an asymmetric shock *i.e.* provincial specific shock absorber. This function can be considered as a prescription of the traditional theory of fiscal federalism stemming from the literature on the positive theory of public finance (*e.g.* Musgrave, 1959): central governments have the responsibility for provincial macroeconomic stabilisation (Oates, 1999). Two channels can be activated: a passive one and an active one. First, automatic fiscal stabilisers can be considered as passive channels of inter-provincial risk sharing. In other words, an asymmetric conjuncture induces mechanic transfers between provinces (Cohen & Follette, 2000). Second, the central government can actively subsidise provinces to compensate for the crisis effects[5] and can use inter-provincial grants, *i.e.* transfers from the central to the regional governments as risk sharing contracts[6].

Consumption smoothing could be achieved with contra-cyclical provincial fiscal deficits. In other words, inter-temporal consumption smoothing in each province can act as a substitute for inter-provincial consumption smoothing. Nevertheless, since 1994 the Chinese budgetary rules limit the extent to provincial fiscal deficits. Consequently, probable wage rigidities and limited inter-provincial labour mobility give a choice between only two solutions: a strong degree of provincial fiscal autonomy or an increase in the desirable level of central redistribution (Mundell, 1961, Kenen 1969).

b - Analytical framework: a model of co-insurance between the Chinese provinces.

We interpret co-insurance between the Chinese provinces as a risk sharing mechanism that could be achieved through either institutional or informal arrangements between the provinces. We do not identify one particular arrangement, either private (*e.g.* inner migrant

[5] This short-term stabilisation function of the fiscal policy should not be confused with the long-term redistribution function that tries to reduce the consumption differentials between provinces.

[6] Recent contributions in the field of fiscal federalism specifically address this issue of risk sharing in a federal structure. Lockwood (1999) interprets intergovernmental grants as risk sharing contracts *i.e.* 'interregional insurance'. Bucovetsky (1998) shows that risk sharing arrangements in a federal structure provide insurance and make federal structures preferable. Lee (1998) examines interactions between assistance to the poor and risk sharing. Flodén (2001) shows that government debt and redistributive taxation help people to smooth consumption in the presence of uninsurable individual specific risk.

remittances) or public (inter-provincial grants), we only focus on the consequences of risk sharing on provincial household consumption.

We examine the behaviour of a representative household for the i^{th} province, $i = 1, \ldots, N$; s indexes the S states of nature occurring with a probability[7] $p(s)$. There are T periods, $t = 1, \ldots, T$. Let $c_{i,s,t}$ design the household consumption in private goods and $y_{i,s,t}$ be its exogenous income. U_i is the inter-temporal utility function that is additively separable over time and states of nature. u_i is the instantaneous utility index that is increasing and concave; its also separable with respect to consumption and leisure:

$$U_i = \sum_{t=1}^{T} \rho^t \cdot \sum_{s=1}^{S} p_s \cdot u_i\left(c_{i,s,t}\right) \qquad (1)$$

Assume that an efficient allocation of risk between the Chinese provinces is described by the weighted sum of utilities of each of the provinces' representative households. λ_i is the weight of the i^{th} household ; $0 < \lambda_i < 1$ and $\Sigma_i \lambda_i = 1$. Assume also that the households have the same time discount rate $\rho > 0$ and the same beliefs with respect to the states of nature. The efficient allocation of risk is given by solving the following program:

$$\max_{c_{i,s,t}} \sum_{i=1}^{N} \lambda_i \cdot U_i$$

subject to the resource constraint that pools the resources of the Chinese provinces:

$$\sum_{i=1}^{N} c_{i,s,t} = \sum_{i=1}^{N} y_{i,s,t} \quad \text{with } c_{i,s,t} \geq 0 \ \forall\ i, s, t. \qquad (2)$$

The corresponding Lagrangian function and multiplier μ associated with the resource constraint are[8] :

$$\ell\left(c_{i,s,t}, \mu\right) = \sum_{i=1}^{N} \lambda_i \cdot U_i + \mu \cdot \sum_{i=1}^{N} \left(y_{i,s,t} - c_{i,s,t}\right) \qquad (3)$$

[7] We assume also that the probabilities of the states of nature are independent *i.e.* income shocks are independent and identically distributed over time.

[8] The multiplier μ that is interpreted as the marginal utility of income in China is also assumed constant over time.

The first order necessary condition (FOC) for an interior solution[9] for household *i* is:

$$\frac{\partial \ell(c_{i,s,t},\mu)}{\partial c_{i,s,t}} = 0 \Leftrightarrow \lambda_i \cdot \rho^t \cdot p_s \cdot \frac{\partial u}{\partial c_{i,s,t}} = \mu \text{ , and } c_{i,s,t} > 0 \ \forall \ i, s, t. \quad (4)$$

It implies that:

$$\frac{\lambda_i}{\lambda_j} \cdot \frac{\partial u / \partial c_{i,s,t}}{\partial u / \partial c_{j,s,t}} = 1 \text{ , and } c_{i,s,t} > 0 \ \forall \ s, t \text{ and } \forall \ i \neq j, \text{ then } \frac{\partial u}{\partial c_{i,s,t}} = \frac{\lambda_j}{\lambda_i} \cdot \frac{\partial u}{\partial c_{j,s,t}} \quad (5)$$

This equality holds across all *N* provinces and means that the consumption of household *i* is a non-linear function of the consumption of household *j* at any point of time and states of nature. This implies that the income of household *i* does not influence its consumption. It rather depends on the average consumption, that is the Chinese aggregate consumption.

To see this theoretical result in a more direct way, we assume that the households have the same instantaneous utility function. More precisely we assume that they have a Constant Absolute Risk Aversion (CARA) utility index where σ measures the risk aversion ($\sigma > 0$):

$$u = -\frac{1}{\sigma} \cdot e^{-\sigma \cdot c} \quad (6)$$

The FOC then becomes:

$$e^{-\sigma \cdot c_{i,s,t}} = \frac{\lambda_j}{\lambda_i} \cdot e^{-\sigma \cdot c_{j,s,t}} \quad \Leftrightarrow c_{i,s,t} = \frac{1}{\sigma} \cdot \left(\ln(\lambda_i) - \ln(\lambda_j)\right) + c_{j,s,t} \text{ , } \forall \text{ s, } t \text{ and } \forall \ i \neq j \quad (7)$$

Define the average Chinese consumption in the following manner:

$$\bar{c}_{s,t} = \frac{1}{N} \cdot \sum_{i=1}^{N} c_{i,s,t} \quad (8)$$

After some calculations we have:

[9] The optimal consumption is strictly positive with an infinite marginal utility of consumption when consumption is zero.

$$c_{i,s,t} = \bar{c}_{s,t} + \frac{1}{N} \cdot \frac{1}{\sigma} \cdot \sum_{j=1}^{N} \ln\left(\frac{\lambda_i}{\lambda_j}\right) \quad (9)$$

So the provinces' household consumption is equal to the average level of consumption in China plus a time-invariant province fixed effect that reflects the relative weight of one province with respect to another one. This equation means that an efficient allocation of income risk between the Chinese provinces implies that the change in one province consumption is equal to the change in the China average consumption. In other words, the households are perfectly insured against idiosyncratic risks *i.e.* provincial specific income risks.

This result holds when we assume that the households face risks concerning their marginal utility indices *i.e.* preference shocks. In this case the utility function of the provinces becomes [10]:

$$u\left(c_{i,t}, \theta_{i,t}\right) = -\frac{1}{\sigma} \cdot e^{-\sigma \cdot \left(c_{i,t} - \theta_{i,t}\right)} \quad (10)$$

where $\theta_{i,t}$ is a time-varying additive unobserved shock that affects preferences. Equation 9 is modified in the following manner:

$$c_{i,s,t} = \bar{c}_{s,t} + \frac{1}{\sigma} \cdot \left(\ln\left(\lambda_i\right) - \sum_{j=1}^{N} \ln \lambda_j \right) + \left(\theta_{i,t} - \sum_{j=1}^{N} \theta_{j,t} \right) \quad (11)$$

Under the latter assumption, the change in one province consumption, net of preference shocks, are equalised across provinces: they may differ from the China average one because of a remaining random shock affecting their preferences. The main implications of the efficient allocation of risks between the provinces are thus the following:

- A province's consumption is unaffected by asymmetric or idiosyncratic income shocks which should not affect the other provinces;

[10] In the presence of several additive income risks, the theoretical results are unchanged. See for example Mace (1991) (cited in Alderman & Paxson, 1992) or Jalan & Ravallion (1999) for a theoretical exposition of these extensions.

– A province's consumption is solely affected by symmetric or co-variant income shocks affecting all the provinces.

3 - Econometric evidence of co-insurance with time series provincial data.

The econometric analysis covers the 1990-2000 period for 30 Chinese provinces[11]. We use official statistics on private consumption and GDP. Data are expressed per capita and deflated by the provinces' consumer price indices (base 100 in 1992).

a - Does there exist a perfect co- insurance mechanism between the Chinese provinces?

The panel data set consists of the N Chinese provinces denoted by i = 1 to N ; N = 30 observed at each of the 11 periods, t = 1990 to 2000. We estimate a regression of the form:

$$\Delta C_{i,t} = \beta \cdot \Delta Y_{i,t} + \sum_t \kappa_t \cdot A_t + \Delta \varepsilon_{i,t} \qquad (12)$$

Δ is the difference operator between t and t-1. The dependent variable $\Delta C_{i,t}$ is the change in the province i consumption. $\Delta Y_{i,t}$ represents the change in the province i GDP. A_t is a dummy that is set to 1 over the period t and t-1 and 0 otherwise. $\sum \kappa_t . A_t$ controls for shocks affecting the China average consumption, so $\Delta Y_{i,t}$ is a measure of idiosyncratic shocks on the province i. $\Delta \varepsilon_{i,t}$ is the usual disturbance term.

The null hypothesis corresponding to perfect insurance between the provinces implies that the estimated β, interpreted as the marginal propensity to consume idiosyncratic shocks, is equal to zero. Moreover κ must be significantly different from zero.

[11] We use the term 'province' as well for the provinces as for autonomous regions and municipalities, for the sake of simplicity. The 'provinces' included in the sample are: Beijing, Tianjin, Hebei, Shanxi, Inner Mongolia, Shanghai, Liaoning, Jilin, Heilongjiang, Jiangsu, Zhejiang, Anhui, Fujian, Jiangxi, Shandong, Henan, Hunan, Guangdong, Guangxi, Hainan, Sichuan, Guizhou, Yunnan, Shaanxi, Gansu, Qinghai, Ningxia, Xingjiang, Hubei, Tibet. The municipality of Chongqing, that became autonomous at the end of the period under study, is included in the province of Sichuan.

We choose the above specification for two main purposes. First, specific effects disappear when taking first differences in consumption and income[12]. Second, first differences are stationary. Income shocks are thus transitory and do not induce adjustments in consumption flows. The Im, Pesaran and Shin test (1997) for heterogeneous panels rejects at the 1% level a collective unit root in provincial GDP and private consumption changes[13].

Changes in provincial GDP and private consumption cannot be considered as orthogonal to the error term for various reasons. First, changes in provincial GDP are measured with error. Second, there exists a simultaneity bias between changes in private consumption and GDP because of the definition of GDP in the national accounts. Finally, unobservable idiosyncratic shocks can be correlated with changes in provincial GDP. We assume however that the error term is orthogonal to lagged changes in provincial GDP so that the latter can be used as instruments[14].

Equation (12) is estimated by the Generalised Method of Moments (Hansen, 1982) that does not require explicit pieces of information about the shape of the disturbance distribution. Moreover it is robust to heteroskedastic disturbances[15]. The estimation is conducted in two ways.

In the first way, equation (12) is estimated on different periods that implies a change in the size of the panel and thus in the instruments. More precisely, on the 1991-2000 period, the maximum lag length in the instrument list is one; until the 1999-2000 period where the maximum lag length is nine. For each period we test the opportunity of instrumentation with the Hausman exogeneity test (Nakamura and Nakamura, 1981). Moreover we test the

[12] An *F*-test at the 1% level rejects the significance of fixed effects for the provinces.

[13] The Im, Pesaran and Shin test consists in calculating a *t* statistic averaged across the provinces. Formally, the equation is of the form $x - x(-1) = a + b.x(-1)$ where x stands for changes in GDP or for changes in consumption. An equation is estimated for each province. The statistic associated with the collective root is calculated as the average value of the *t* statistic associated with *b*. The average calculated *t* are respectively –2,160 for the changes in GDP and –2,471 for the changes in consumption.

[14] This is equivalent as considering that measurement errors are not correlated through time.

[15] The hypothesis of absence of auto-correlation cannot be rejected at the 1% level. It is thus useless to use an estimator that is robust to auto-correlation. When we however use it, the results are not modified.

instruments' validity with the over-identification *J* statistic (Newey and West, 1987)[16]. Finally we check the significance of the temporal dummies $\Sigma_t \kappa_t.A_t$ with a *F* test. The results are presented in Table 1.

Table 1. The perfect co-insurance test on different periods.

Period	β	*T* –statistics	Hausman *T*-test	Over-identification test: *J*-test (number of restrictions)	Adjusted R^2	Temporal dummies *F*-test	Number of observations
1991-2000	0.313	9.496 ***	-1.848 *	-	0.586	3.227 ***	300
1992-2000	0.324	9.954 ***	-2.557 **	1.168 (1)	0.649	3.596 ***	270
1993-2000	0.326	10.251 ***	-2.827 ***	0.997 (2)	0.619	3.648 ***	240
1994-2000	0.299	11.752 ***	-3.081 ***	5.574 (3)	0.661	3.994 ***	210
1995-2000	0.292	11.578 ***	-3.058 ***	4.423 (4)	0.647	3.824 ***	180
1996-2000	0.286	11.421 ***	-2.926 ***	4.911 (5)	0.626	3.742 ***	150
1997-2000	0.285	12.469 ***	-2.113 **	5.750 (6)	0.621	3.313 **	120
1998-2000	0.261	10.748 ***	-0.296	3.598 (7)	0.560	4.906 ***	90
1999-2000	0.218	4.551 ***	1.032	4.831 (8)	0.328	1.856	60

Significance levels: *** :1%, ** : 5%, * : 10%.

Note that the Hausman test is not significant on the 1998-2000 and on the 1999-2000 periods that questions the interpretation of the corresponding equation[17]. On the other periods, we reject the hypothesis of a perfect co-insurance mechanism. The β coefficient interpreted as the marginal propensity to consume idiosyncratic shocks is approximately 0.3 on the 1991-2000 to 1997-2000 periods. Our results do not deliver a temporal heterogeneity of the β coefficients.

In the second way, we test the sensitivity of our results to the instrument set by estimating a system of 11 simultaneous equations with the GMM estimator. Each equation corresponds to one particular period. The number of observations in each equation equals the

[16] Under the null hypothesis of over-identification, the *J* statistic multiplied by the number of restrictions is distributed like a Khi-square where the degrees of freedom are given by the difference between the number of parameters and the number of instruments. We also verify the explanatory power of the maximum lagged instrument in the auxiliary equation.

[17] When we estimate the last 2 equations with OLS and a White correction the estimated β are respectively 0,274 (*t* = 9,511***) and 0,295 (*t* = 5,462***). Moreover, on the last period, the dummies are not significant.

number of the Chinese provinces. The maximum lag length in the instruments is 4. We impose that the β coefficient is the same between each equation, which is consistent with our previous results. The results are given in table 2 and do not contradict the previous ones.

Table 2. The perfect co-insurance test with simultaneous equations.

Period	β	*T* Statistic	Over-identification *J*-Test (number of restrictions)	Number of observations
1990-2000	0.290	200.270 ***	29.469 (24)	30

Significance level : *** : 1%.

Whatever the way we estimate equation (12), we reject the proposition according to which there exists a perfect insurance mechanism against income fluctuations between the Chinese provinces. This result is however not surprising. It is consistent with existing empirical literature. Indeed microeconometric analyses of co-insurance (*e.g.* Jalan and Ravallion, 1999 on rural China) as well macroeconometric analyses that quantify the amount of risk sharing, reject the perfect co-insurance proposition (Asdrubali *et al.* 1996, Athanasoulis & Van Wincoop, 2001 on states in the United States). It is also consistent with recent works on China stressing either the worsening of the distribution of fiscal resources across provinces through time or the symbolic significance of equalisation grants from central to local governments.[18]

To the extent that perfect co-insurance is empirically rejected, we now turn to a weaker proposition.

b - Does there exist an imperfect co-insurance mechanism between the Chinese provinces?

Empirical evidence on insurance mechanisms suggests that β is significantly different from zero, thus rejecting the complete insurance *i.e.* the complete risk-sharing hypothesis. If β were found to be equal to one, we should suppose that there is no insurance at all. The intermediate case where β is strictly less than 1, that is not predicted by the theoretical model, is usually interpreted as partial co-insurance. However, we can question this interpretation by

[18] See World Bank (2002) for a extensive description of fiscal decentralisation and expenditure assignments in China.

investigating the reaction of provincial consumption to asymmetric as well as symmetric shocks[19].

We thus propose to estimate the following equation (13) that is the same as equation (12) without the temporal dummies[20]. $\Delta\omega_{i,t}$ is the disturbance term:

$$\Delta C_{i,t} = \phi \cdot \Delta Y_{i,t} + \Delta\omega_{i,t} \qquad (13)$$

The results[21] are presented in Table 3.

Table 3. The imperfect co-insurance test.

Period	ϕ	T – statistics	Hausman T-statistics	Over-identification J-test	Adjusted R^2
1991-2000	0.313	8.799 ***	-1.705 *	-	0.558
1992-2000	0.323	8.571 ***	-2.445 **	1.711	0.585
1993-2000	0.330	9.158 ***	-2.813 ***	1.842	0. 588
1994-2000	0.297	10.820 ***	-2.995 ***	5.523	0.618
1995-2000	0.279	10.874 ***	-2.859 ***	7.095	0.619
1996-2000	0.286	10.586 ***	-2.994 ***	9.856 *	0.626
1997-2000	0.259	12.608 ***	-1.969 **	6.915	0.597
1998-2000	0.232	9.337 ***	-0.346	3.856	0.519
1999-2000	0.212	4.093 ***	0.647	4.524	0.319

Significance levels: *** : 1%, ** : 5%, * : 10%

We find that the estimated β and ϕ do not differ significantly. There does not seem to exist a difference between on the one hand the marginal propensity to consume out idiosyncratic shocks (β) and on the other hand the marginal propensity to consume out all shocks (ϕ). Asymmetric shocks alone seem to have the same impact on consumption as both asymmetric and symmetric shocks. We interpret this result as the rejection of partial co-insurance against idiosyncratic shocks. Indeed, the latter proposition would imply a difference between the estimated ϕ and β.

[19] Morduch (1995) on micro-economic data explains that measurement errors that are correlated through time may cause the rejection of the perfect insurance hypothesis.

[20] In other words, this is equivalent as testing the existence of a random walk in consumption: the instrumented $\Delta Y_{i,t}$ can be interpreted as the expected change in GDP (Hall, 1978, Deaton, 1992). Under the permanent income and rational expectation hypotheses, the predicted value of the ϕ coefficient is zero: changes in consumption are solely caused by unexpected changes in income.

[21] The Hausman exogeneity test is negative for the last two periods. Equation (13) is thus estimated wwith OLS and a White correction. The corresponding ϕ are respectively 0,272 (t = 8,854***) and 0,308(t = 5,872***). Notice that the result on the 1996-2000 period is questionable, as the over-identification test is significant at the 10% level.

The estimation of a simultaneous equations system using the same method as previously does not invalidate this result[22].

Table 4. The imperfect co-insurance test with a system of simultaneous equations.

Period	ϕ	T statistic	Over-identification *J* test (number of restrictions)
1990-2000	0.295	660.441 ***	24.142 (24)

Significance levels: *** : 1%.

4 - Conclusion

There now exist several studies on the decentralisation of revenue and spending decisions (*e.g.* Oates, 1999 for a review). They mainly focus on the evidence between decentralisation and economic performance. For instance, Zhang and Zou (2001) find a robust negative relationship in China. Our results shed an another light on the detrimental consequences of current fiscal institutions of China. Indeed, our econometric results suggest that consumption stabilisation mechanisms between provinces do not exist in China: public inter-provincial transfers do not compensate for private insurance market failures.

The prevalence of uninsured provincial income risk has negative effects on efficiency and equity. On the one hand, if income fluctuations cannot be mitigated, provinces household decisions cannot be based on profit maximising alone. They cannot completely exploit their comparative advantages. They must engage in costly risk-management activities. Household may preferably hold unproductive assets that are however imperfect insurance substitutes. At the moment, the Chinese Central Government seems to address this issue in three ways. First it allows for the relaxation of the provincial budgetary constraints through extra-budgetary spending or more exceptionally through provincial public borrowing.[23] Second the Central Government relaxes the legal obstacles to labour mobility between the provinces. Third, it

[22] We can wonder whether provinces have a different reaction to shocks. This question is addressed with the test of the spatial stability of the estimated propensities. We thus estimate equation (12) and (13) with a multiplicative spatial dummy taking the value of the change in GDP for coastal provinces and 0 otherwise. The corresponding coefficient is never significant.

[23] Asdrubali *et al*. (1996) find that capital market smoothing is the main absorber of states' product shocks in the US between 1964 and 1990.

promotes a degree of wage flexibility that is a substitute to migration.[24] On the other hand, uninsured provincial income risk can widen the welfare gap between the provinces insofar as risk is costlier for the poorest. Their resource constraint is binds, so that they can not afford for self-insurance mechanisms.

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