Price Transmission from the Corn Market to the Hog Market in Québec

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    - Government support, packing capacity, price of corn
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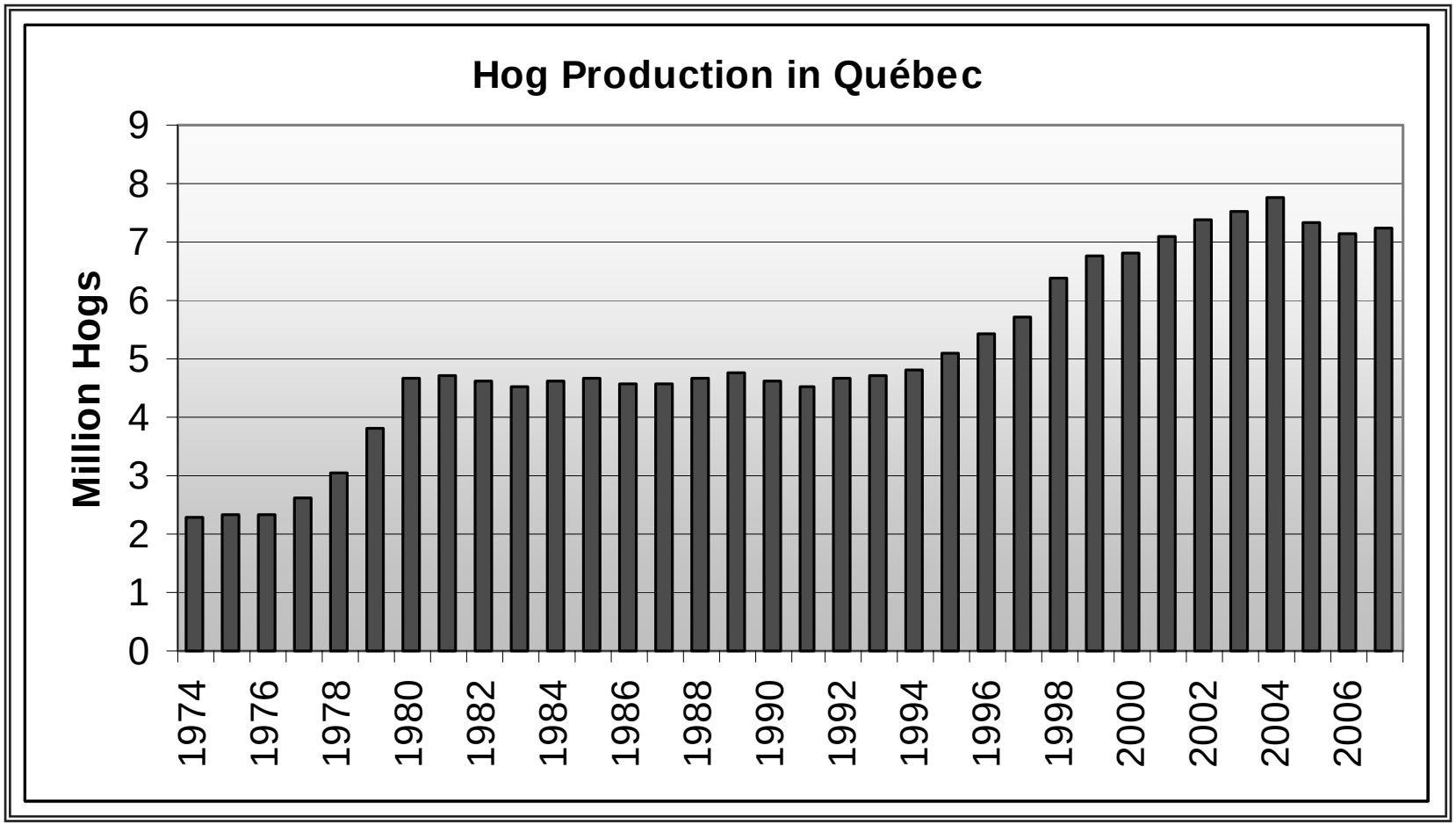
Hog production in Québec

- 1 417 hog farms
- 55 % farrow to finish (28% finish & 17% farrow)
- Average 316 sows, 6 700 hogs produced
- Hog feed : 65% corn, 20% soymeal
- In the 90's, production rapidly rising, but :
  - Moratorium on hog barn construction (2002-2005)
  - Circovirus (2005-2006)

Hog production in Québec



Source : AAC, 2008

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Hog Marketing in Québec

Joint Marketing Plan for Slaughter Hogs

- Marketing Board (Fédération des producteurs de porcs du Québec)
- Processors must negotiate with the board
  - for plants with a slaughter capacity of 1 000 head/week
- Almost 99 % of slaughter hogs sold through the marketing plan

Hog Marketing in Québec

Pricing

- Packers buy on a three way marketing system
  - Preattributions (50 % of hogs allocated according to historical purchases, formula price based on USDA's lm_hg 201)
  - English contracts (formula price ± premium negotiated monthly) (25 % of hogs)
  - Auction (25 % of hogs)
- Producers receive the weekly average price of the three ($/100 kg, index 100)

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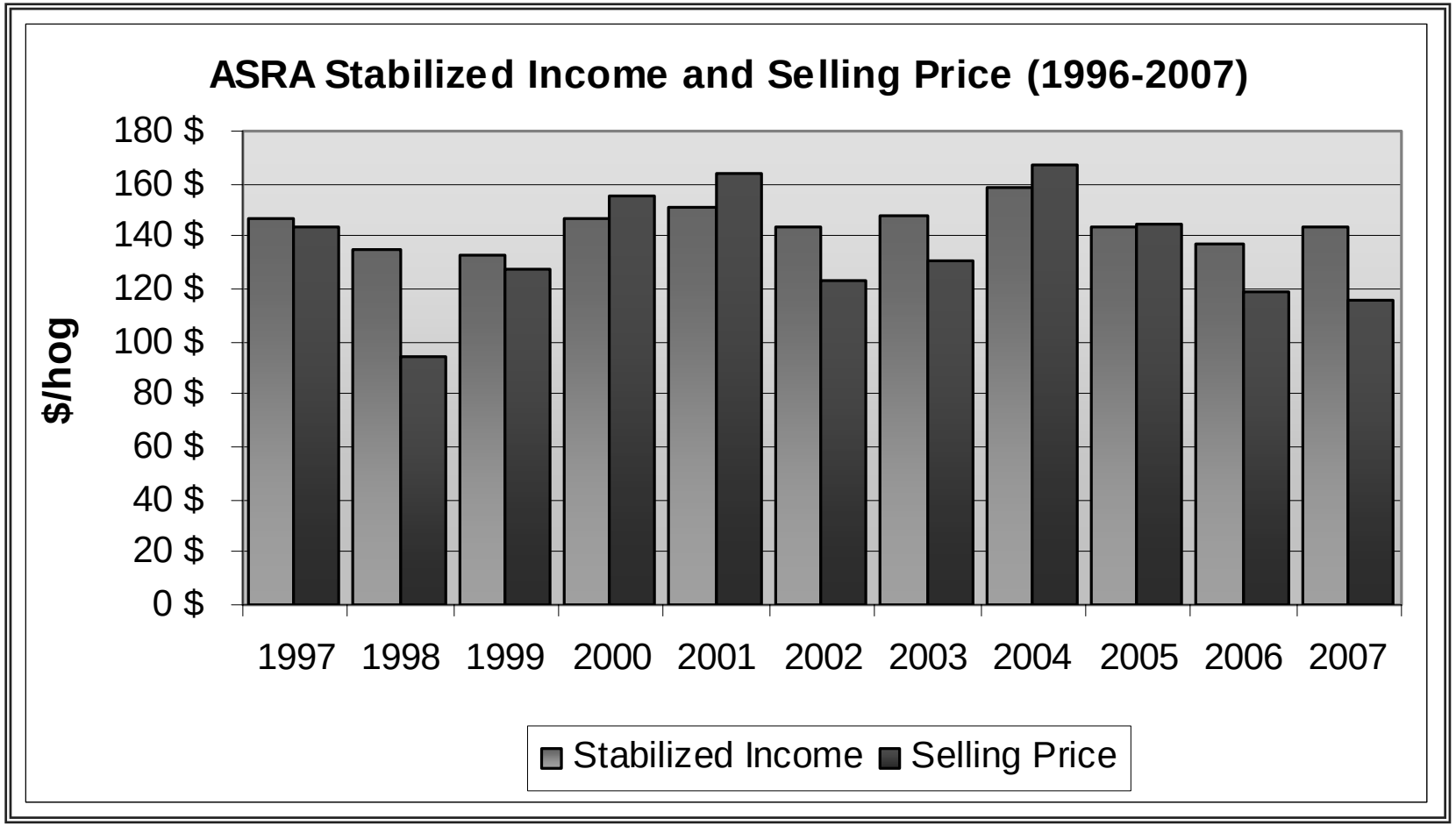
Government Support (ASRA)

Assurance stabilisation du revenu agricole (ASRA), or Farm Income Stabilization Insurance

- Covers most productions, including slaughter hogs and feeder pigs (25 kg)
- Survey to evaluate production costs
- Compensation paid when average selling price is lower than the stabilized income
- Program funded 2/3 governments, 1/3 producers

Government Support (ASRA)



Source : La Financière agricole du Québec, 2008

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Demand : Packing Capacity

1997-2004 : Rising capacity with production and export boom

- from 122 000 heads/week to 180 000

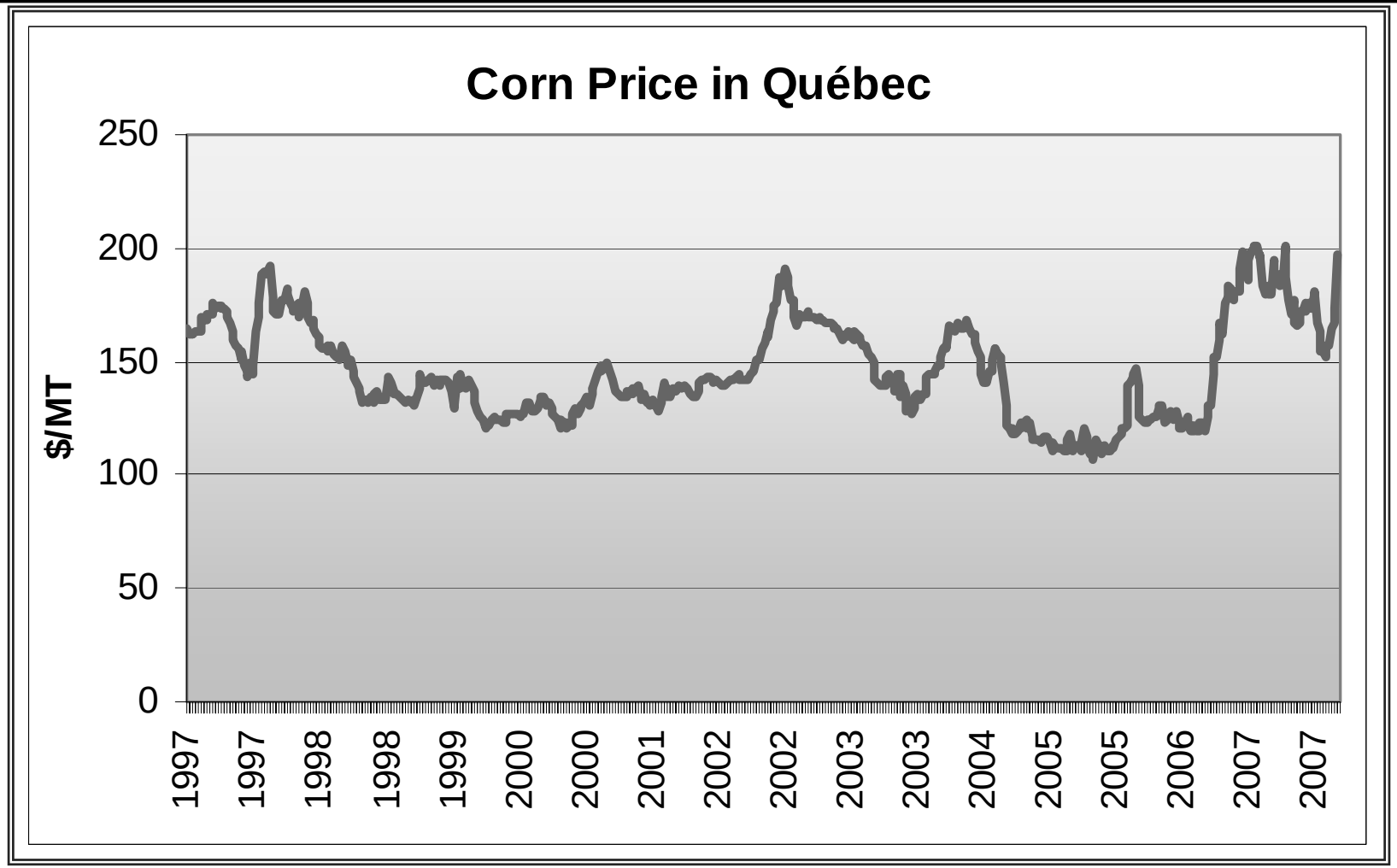
2004-2007 : crisis in a making

- Exchange rate (from 65 ¢US to 1 $US)
- Hog supply topped in 2004

2006-2007 : packing crisis

- Strikes, bankruptcies, plants closing (3)
- Results in 2007 : 7 packers, 9 plants and 145 000 heads capacity left

Price of Corn



Source : AAC, 2008

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Objective

- Corn price increase
- Hog price does not follow
- Interest in understanding price transmission between corn and hog markets given Québec hog market issues

Econometric analysis

Approach : Vector autoregressive (VAR) framework

$$X_t = \Phi_1 X_{t-1} + \Phi_2 X_{t-2} + \ldots + \Phi_p X_{t-p} + \Psi W_t + \varepsilon_t \quad (1)$$

Where

X_t is a (*m x 1*) vector of jointly determined variables

W_t is a (*q x 1*) vector of deterministic and or exogenous variables

Φ_i (i=1,…,p) and Ψ are (*m x m*) and (*m x q*) matrices of coefficient to be estimated

E_t is a (*m x 1*) vector of n.i.d. disturbances with zero mean and non-diagonal covariance matrix, Σ

Econometric analysis – Model (cont'd)

Structural vector error correction (VEC)

$$\Delta x_t = \alpha\beta' x_{t-p} + \sum_{i=1}^{p-1} \Gamma_i \Delta x_{t-i} + \Psi w_t + \varepsilon_t$$

Where

β is a (*m x r*) matrix of co-integrating vector relationship between variable

α is a (*m x r*) matrix of error correction coefficients

Γ_i : the coefficients of this matrix estimate the short-run effect of shocks on Δx_t

Econometric analysis (cont'd)

Data - Monthly price data spanning Jan 1997 to Dec 2007

- Québec hog price (from Fédération des producteurs de porcs du Québec), $/100 kg carcass weight equivalent
- Québec corn price (from Agriculture and Agri-food Canada), $/TM
- Stabilized income (from Financière agricole du Québec), $/100 kg carcass weight equivalent

Empirical results

Stationarity test

Augmented Dickey-Fuller test statistics			
Level			
Variables	lags	Statistics	P-value
phog	1	-0,53	0,4867
pcorn	1	-0,76	0,3877
pasra	1	0,16	0,7299
First differences			
D_phog	1	-10	< 0.0001
D_pcorn	1	-8,91	< 0.0001
D_pasra	1	-7,91	< 0.0001

Empirical results (cont'd)

Johansen cointegration rank test

H_0	Trace	5 % c.v.
r = 0	58.95	29.38
r = 1	24.08	15.34
r = 2	3.50	3.84

Empirical results (cont'd)

Cointegration relationships

	β		α	
	r = 1	r = 2	r = 1	r = 2
Phog	5.738	-2.113	-0.049	0.030
Pcorn	0.659	4.593	-0.018	-0.032
Pasra	1.170	1.749	-0.075	-0.025
Normalization				
Phog	1	1	-0.279	-0.064
Pcorn	0.115	-2.173	-0.103	0.069
Pasra	0.204	-0.828	-0.431	0.052

Empirical results (cont'd)

Testing weak exogeneity of each variable

Variables	DF	Chi-square	P-Value
Phog	2	23.04	<.0001
Pcorn	2	10.58	0.0051
Pasra	2	20.42	<.0001

Empirical results (cont'd)

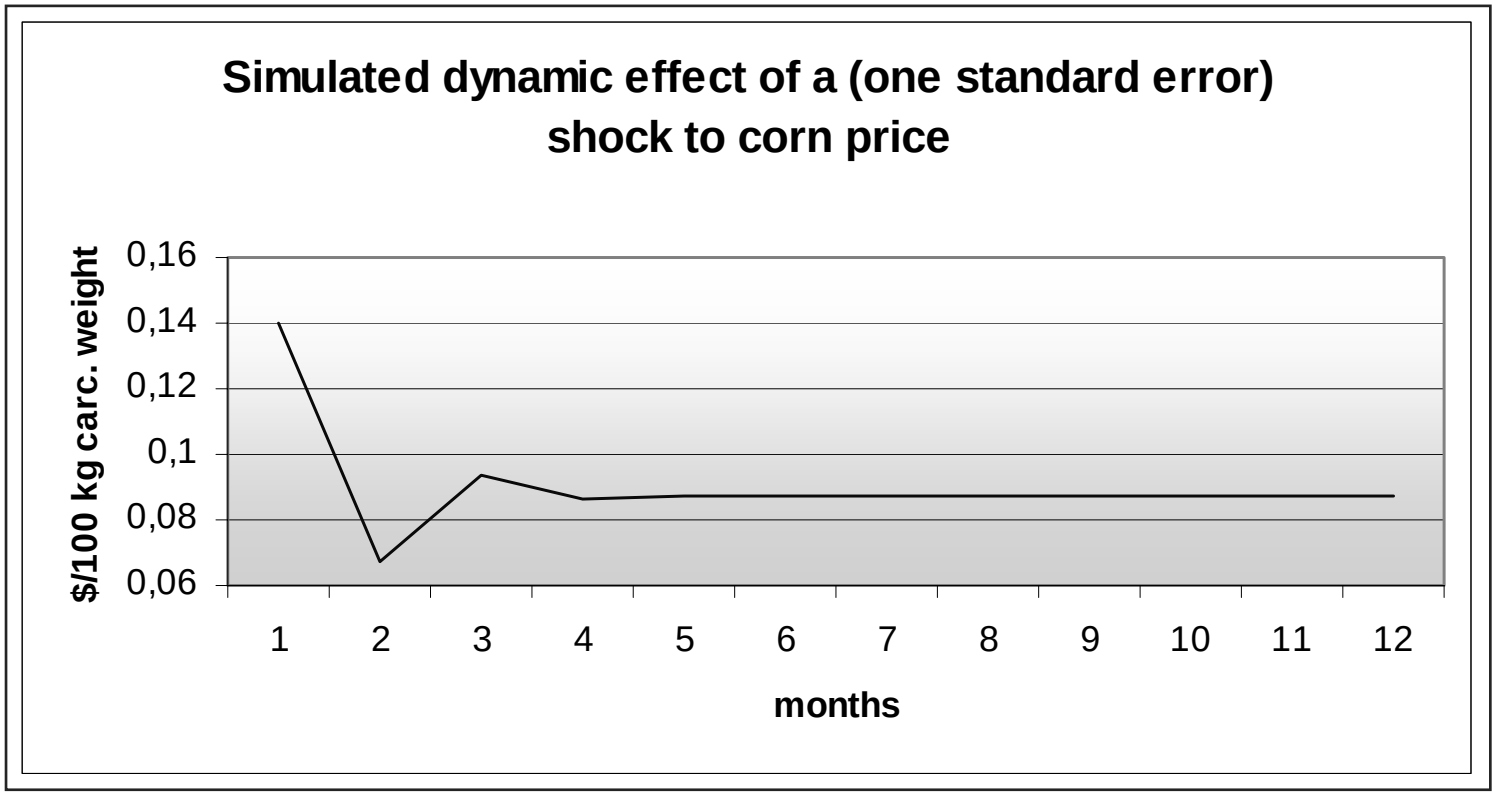
Over-identifying restrictions on long-run parameters

Variables	r = 1	r = 2
Phog	1	1
Pcorn	-0.015	-2
Pasra	0	-0.8

P-Value = 0.33

Empirical results (cont'd)

Impulse response function



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Thank you

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