PAPERS PRESENTED AT THE NEW ZEALAND BRANCH AUSTRALIAN AGRICULTURAL ECONOMICS SOCIETY CONFERENCE

Blenheim (July, 1988)

Volume 2

Published on behalf of the New Zealand Branch Australian Agricultural Economics Society

by

Agribusiness and Economics Research Unit Lincoln College Canterbury

Discussion Paper No. 121

November 1988

ISSN 0113-4507

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VOLUME 1

TABLE OF CONTENTS

THEME ONE: TRADE POLICY AND THE GATT NEGOTIATIONS	
Invited Speakers	
Trade Policy and The GATT Negotiations	4
Don Greeniieid	T
On the Meaning and Measurement of Agricultural	
Trade Distortions	C C
bonaid Macharen	0
Contributed Papers	
GATT Multilateral Trade Negotiations and Forest Products Trade	
I J Bourke and D Wije-Wardana	18
Technical Aspects of Trade Negotiations	
Ronnie Horesh and S SriRamaratnam	28
The Ingidence of Trade Poligies on Agrigulture:	
The Case of Ecuador	
Veronica Jardine, Grant M Scobie	
and Gary R Baker	61
THEME TWO: NON-GOVERNMENT ARRANGEMENTS FOR FUNDING	
AGRICULTURAL RESEARCH	
Operating a R & D Organisation in the	
User-Pay Environment	
T D Heiler	80
Funding and Resource Allocation in Rural and Wool	
Research - An Australian Viewpoint R A Richardson	92
K A KICHAIGSON	54
THEME THREE: ADJUSTMENT IN AGRICULTURE	
Adjustment in Agriculture: Agribusiness	
R W M Johnson	103
Contributed Papers	
Adjustment in the Wheat and Flour Industry	
D K Crump	113
Structural Adjustment in Egg Price Determination	
John Gibson, Bert Ward & Ralph Lattimore	137
Adjustments in the Kiwifruit Industry	
Walter Moore and Ron Sandrey	154

VOLUME 2

TABLE OF CONTENTS

P THEME FOUR: INTERNATIONAL AGRIBUSINESS ISSUES	age
Speech Notes for AAES NZ Branch Conference A J Pollock	175
International Marketing - Prospects for Statutory Producer Marketing Organisations Rowland Woods	184
Controlling Exports: The Role of Marketing Boards A C Zwart	190
<u>Contributed Papers</u> Commodity Markets and NZ Exports R W M Johnson	209
Kiwifruit - A Case for the International Co-ordination of Marketing Strategies O Negendank	230
GENERAL CONTRIBUTED PAPERS	
Is the Recent Sharp Drop in Fertiliser Usage a Major Concern for Pastoral Production? Y S Chiao	247
Why Farmers Should Worry about the Budget Balance Gus Hooke	256
Social Policy Bonds Ronnie Horesh	266
Macroeconomic Policy, the Real Exchange Rate and Agricultural Growth: The Case of Ecuador Grant M Scobie and Veronica Jardine	281
The New Zealand Live Sheep Export Quota: The Potential Impact and Economic Considerations S SriRamaratnam	300
Single Market Disequilibrium Models: An Introduction and Application to Agricultural Finance in New Zealand R L St Hill	319
List of Participants	338
Notes (a) No papers were produced for the invited addresses John Pryde in Theme One and Chris Day in Theme Four.	by
(b) The invited address by Ron Sandrey in Theme Three published as "Agricultural Policy Reforms in Zealand, 1984, An Initial Evaluation", Ralph Lattime Bruce Ross and Ron Sandrey, Proceedings of Internation Agricultural Economists Conference, Buenos Air	is New ore, onal ces,

Argentina, August 1988.

SPEECH NOTES FOR AAES NZ BRANCH CONFERENCE

SATURDAY, 9 JULY 1988

A J Pollock New Zealand Dairy Board, Wellington

THIS PAPER EXAMINES THE TOPIC OF INVESTMENT IN INTERNATIONAL MARKETING FROM THE PERSPECTIVE OF THE NEW ZEALAND DAIRY INDUSTRY AS A WHOLE, NOT JUST THE NEW ZEALAND DAIRY BOARD WHICH IS THE EXPORT MARKETING ARM OF THE INDUSTRY.

THE DAIRY INDUSTRY HAS OVER A CONSIDERABLE PERIOD MADE SUBSTANTIAL INVESTMENTS IN MARKETING AND HAS DEVELOPED AN INDUSTRY WHICH IS PROBABLY MORE VERTICALLY INTEGRATED THAN ANY OTHER IN NEW ZEALAND. A NEW ZEALAND FARMER VISITING A SUPERMARKET IN THE UK 12,000 MILES FROM HOME CAN LOOK AT A PACKET OF ANCHOR BUTTER, THE LEADING BRAND ON THE SHELF, AND PRICED AT ABOVE THE AVERAGE OF COMPETING BRANDS AND KNOW THAT HE HAS RETAINED OWNERSHIP AND RECEIVED THE FULL VALUE FOR THE PRODUCT RIGHT UP TO THE POINT WHERE IT WAS DELIVERED TO THE LOADING DOCK OF THAT SUPERMARKET'S WAREHOUSE AND THAT HE OWNS THE PROCESSING, PACKING, MARKETING AND DISTRIBUTION COMPANIES AND THE PROFITS THAT THEY HAVE MADE ON HANDLING THAT PRODUCT.

IN ORDER TO PROPERLY DISCUSS THE PRINCIPLES THAT HAVE BEEN EMPLOYED IN MAKING THESE INVESTMENTS IN INTERNATIONAL MARKETING, I WOULD LIKE TO START BY EXAMINING THE FULL EXTENT OF THE MARKETING PROCESS.

AGRICULTURAL MARKETING IS, OF COURSE, THE MARKETING OF THE PRODUCTS OF THE LAND, IN THIS CASE MILK.

IN EXAMINING THE MARKETING PROCESS WE NEED TO LOOK ALL THE WAY THROUGH TO THE END CONSUMERS AND IDENTIFY EXACTLY WHAT THEY CONSUME, WHERE AND HOW THEY CONSUME IT AND WHAT THE STEPS ARE BETWEEN THE FARMER WHO PRODUCES THE MILK AND THAT END CONSUMER.

THIS CHART IDENTIFIES THE STEPS THAT ARE INVOLVED IN CONVERTING MILK AT THE FARM GATE TO A PRODUCT ON SOMEBODY'S BREAKFAST TABLE ON THE OTHER SIDE OF THE WORLD OR, IN THE CASE OF SOME OF THE MORE EXOTIC PRODUCTS OF MILK, THE PAPER FACTORY OR THE PHARMACEUTICAL LABORATORY. AT EACH POINT IN THIS CHAIN THERE IS AN OPPORTUNITY FOR A TRANSFER OF OWNERSHIP AND INVESTMENT IN ONE FORM OR ANOTHER WILL BE REQUIRED. THIS IN TURN WILL REQUIRE A RETURN TO BE EARNED ON THE INVESTMENT AND A PROFIT TO BE MADE BY THOSE THAT MAKE IT.

IF WE START AT THE FARM GATE THIS REPRESENTS THE MOST BASIC TRADE. FOR MANY FARMERS, AND THAT IS PROBABLY THE VAST MAJORITY OF FARMERS IN THE WORLD, THEIR INTEREST STOPS AT THAT POINT AND FOR THEM MARKETING CONSISTS OF TRYING TO ENSURE THAT THERE IS MORE THAN ONE BUYER BIDDING FOR HIS PRODUCT SO THAT HE CAN HAVE THE OPPORTUNITY OF PLAYING ONE OFF AGAINST THE OTHER AND HIS INTEREST IN THE PRODUCT AND ITS EVENTUAL MARKETING STOPS AT THAT POINT.

THERE ARE OF COURSE, VERY FEW AGRICULTURUAL PRODUCTS THAT CAN BE CONSUMED IN THE FORM IN WHICH THEY LEAVE THE FARM GATE AND THAT IS CERTAINLY TRUE OF THE DAIRY INDUSTRY. A SMALL PROPORTION OF THE MILK PRODUCED IN NEW ZEALAND UNDERGOES MINIMUM PROCESSING IN THE FORM OF PASTEURISING AND BOTTLING BUT THE VAST MAJORITY, AROUND 90%, GOES TO THE MANUFACTURING INDUSTRY WHERE IT IS A RAW MATERIAL TO BE TRANSFORMED INTO A MYRIAD OF DIFFERING END PRODUCTS.

THE DIVERSITY OF PRODUCTS THAT CAN BE MADE FROM MILK IS SO WIDE THAT THE DECISIONS OF "WHICH ONES" AND "HOW MUCH" ARE VERY COMPLEX. IF THE WRONG DECISIONS ARE MADE AND THERE IS TOO MUCH OF A PARTICULAR SPECIFICATION, ESPECIALLY ONE WITH A LIMITED SHELF LIFE THE LOSSES CAN BE CONSIDERABLE. CONVERSELY, IF TOO LITTLE IS MADE DURING THE STRICTLY LIMITED PRODUCTION SEASON, THERE WILL BE NO OPPORTUNITY TO MAKE MORE UNTIL THE NEXT SEASON AND VALUABLE BUSINESS OPPORTUNITIES CAN BE IRRETRIEVABLY LOST.

THESE PRODUCTS MUST NOW BE EXPORTED. THE EXPORTER MAY BE SIMPLY A TRADER (WHERE THE PRODUCT IS GOING TO ANOTHER MANUFACTURER TO BE INCORPORATED INTO A DIFFERENT END PRODUCT OR TO A MARKETER WHO MAY SIMPLY REPACK THE PRODUCT INTO HIS OWN PROPRIETORY BRANDS) OR A MARKETING ORGANISATION WHICH IS EITHER MARKETING A FINISHED PRODUCT ITSELF OR THROUGH A SUBSIDIARY COMPANY IN THE EXPORT MARKET.

THERE MUST THEN BE AN IMPORTER WHO WILL EITHER BE ANOTHER TRADER OR A MANUFACTURER OR MARKETER OR THE AGENT OR SUBSIDIARY OF A NEW ZEALAND MARKETER.

THEN THERE HAS TO BE A DISTRIBUTOR WHO WILL GET THE PRODUCT TO THE RETAILER OR IN SOME INSTANCES TO AN INSTITUTIONAL USER WHO WILL SERVE THE PRODUCT IN A FORM WHICH MAY OR MAY NOT BE IDENTIFIABLE TO THE PERSON WHO ACTUALLY USES IT OR TO A MANUFACTURER WHO WILL USE THE PRODUCT AS AN INDUSTRIAL RAW MATERIAL.

AND FINALLY, THERE WILL BE A RETAILER WHO WILL SELL PRODUCTS TO THE END CONSUMER.

EACH OF THESE STEPS WILL TO A GREATER, OR LESSER EXTENT, REQUIRE INVESTMENT AND THE QUESTION ARISES WHO SHOULD MAKE IT AND WHY.

THE OBVIOUS ANSWER TO THE QUESTION OF "WHY" IS TO OBTAIN A RETURN ON THAT INVESTMENT AND THAT PRINCIPLE WILL APPLY REGARDLESS OF WHETHER YOU'RE TALKING ABOUT A MANUFACTURER WHO CONVERTS THE RAW MATERIAL TO A FINISHED PRODUCT OR WHO USES THAT PRODUCT AS AN INGREDIENT OR A TRADER OR A DISTRIBUTOR OR A RETAILER. EACH WILL BE SEEKING TO MAKE A RETURN ON THEIR INVESTMENT AND WILL BE APPLYING THE SAME BUSINESS PHILOSOPHY AS EVERY TRADER AND BUSINESSMAN SINCE THE VENETIANS HAS EMPLOYED AND THAT IS QUITE SIMPLY TO BUY CHEAP AND SELL DEAR.

FOR THE PRODUCER, IF HE IS IN A POSITION TO SEE WHAT HAPPENS BEYOND THE FARM GATE, THIS IMMEDIATELY CREATES A CONFLICT FOR HIM. HIS BEST RETURN IS ACHIEVED IF HE CAN BUY CHEAP (WHICH IN A FARMING SENSE TRANSLATES INTO OPERATE EFFICIENTLY) AND SELL DEAR AND HE WOULD LIKE EVERYONE ELSE IN THE CHAIN TO BUY DEAR, AND IN ORDER TO MAXIMISE VOLUME, SELL CHEAP.

UNFORTUNATELY, THIS IS AGAINST ALL THE RULES OF HUMAN NATURE AND THE PRINCIPLES OF ECONOMICS AND BUSINESS. IT IS AN UNFORTUNATE FACT THAT SINCE AGRICULTURAL PRODUCERS ARE THE LAST LINK IN THE CHAIN, THEY HAVE NO OPTION BUT TO ACCEPT A SITUATION WHERE THEY ARE RECEIVING FOR THEIR RAW MATERIAL THE RESIDUAL VALUE OF THE END PRODUCT AFTER EVERYONE ELSE HAS TAKEN THEIR PROFIT. ONE SOLUTION TO THIS PROBLEM WHICH IS COMMON IN SO MANY OF THE WEALTHY INDUSTRIAL COUNTRIES, IS TO SEEK THE INTERVENTION OF GOVERNMENT TO EITHER LEGISLATE A MINIMUM FARM GATE PRICE ARRANGEMENT OR ALTERNATIVELY, TO ACTUALLY INTERVENE AND TO OFFER TO PURCHASE THE PRODUCT AT AN AGREED PRICE WHICH USUALLY HAS NOTHING TO DO WITH WHAT CONSUMERS ARE PREPARED TO PAY. SOMETIMES, IN FACT MOST OFTEN, SUCH INTERVENTIONIST ARRANGEMENTS ARE ACCOMPANIED BY PARALLEL ARRANGEMENTS WHICH LIMIT PRODUCTION SO THAT THERE IS SOME SORT OF BALANCE AGAINST THE LEVEL OF CONSUMPTION WHICH IS ALSO LIKELY TO BE CONSTRAINED BY AN ARTIFICIALLY HIGH PRICE.

SUCH AN ARRANGEMENT IS ALSO IN MANY INSTANCES ACCOMPANIED BY EXPORT SUBSIDIES TO ENABLE THE INEVITABLE SURPLUSES TO BE DUMPED IN THIRD MARKETS. IN THE CASE OF THE DAIRY INDUSTRY WHERE VIRTUALLY ALL OF THE PRODUCT ENTERING INTERNATIONAL TRADE FROM ORIGINS OTHER THAN NEW ZEALAND BENEFITS FROM SOME SORT OF EXPORT SUBSIDY, THIS IS CERTAINLY SO.

IN OTHER WORDS, THERE IS NO "MARKET" IN THE CONVENTIONAL ECONOMIC SENSE OF THERE BEING WILLING BUYERS AND WILLING SELLERS WHO WILL OPTIMISE COSTS, SELLING PRICES AND VOLUMES.

WHAT THEN SHOULD A PRODUCER DO, WHEN HE DOES NOT HAVE ACCESS TO GOVERNMENT SUPPORTS BUT DOES HAVE A SUFFICIENT COMPARATIVE ECONOMIC ADVANTAGE IN HIS BASIC PRODUCTION COSTS, TO HAVE A CHANCE OF SUCCEEDING IN THIS HIGHLY ARTIFICIAL ENVIRONMENT.

THIS ALSO TOUCHES ON THE QUESTION OF WHO SHOULD MAKE THE MARKETING INVESTMENTS AND THE NZ DAIRY INDUSTRY HAS DEALT WITH THIS QUESTION BY ADOPTING A POLICY OF VERTICAL INTEGRATION AND PROGRESSIVELY MOVING DOWNSTREAM.

SOME OF THESE MOVES DOWNSTREAM WERE MADE A VERY LONG TIME AGO AND OTHERS ARE MORE RECENT AND IN MANY INSTANCES ARE STILL INCOMPLETE. THE FIRST STEP IN THE CHAIN, THE CONVERSION OF MILK INTO A USABLE PRODUCT, HAS TRADITIONALLY BEEN CARRIED OUT BY CO-OPERATIVE MANUFACTURING COMPANIES OWNED BY THE SUPPLYING FIFTY YEARS AGO THERE WERE NEARLY 500 FARMERS. MANUFACTURING CO-OPERATIVES AND EVEN TEN YEARS AGO THERE WERE 57. TODAY THERE ARE TWENTY-TWO WITH A COMBINED CAPITAL EQUITY OF \$535 MILLION. THIS CONSOLIDATION OVER THE YEARS HAS BEEN IN RESPONSE TO THE NEED TO BE EVER MORE EFFICIENT TO COMPETE IN THIS ARTIFICAL EXTERNAL MARKET AND TODAY, A TYPICAL NEW DAIRY FACTORY WOULD REQUIRE A CAPITAL INVESTMENT IN EXCESS OF \$100 MILLION. THE SCALE OF THIS INVESTMENT IS SUCH THAT ONLY AN ENTITY WHICH TOTALLY DOMINATES ITS AREA OF SUPPLY COULD HOPE TO SUCCEED. THE MERGERS AND AMALGAMATIONS OF THE PAST HAVE ALLOWED THE NEW ZEALAND DAIRY INDUSTRY TO CONTINUE TO MAKE ITS INVESTMENTS AT A RATE AT LEAST EQUAL TO ITS COMPETITORS SO THAT WE NOW HAVE A SITUATION WHERE THE AVERAGE AGE OF PLANT INSTALLED IN NEW ZEALAND IS PROBABLY YOUNGER THAN IN MOST OTHER MAJOR DAIRY PRODUCING COUNTRIES. AS A RESULT OUR ENORMOUS COMPARATIVE ECONOMIC ADVANTAGE IN MILK PRODUCTION IS NOT ERODED IN THE CONVERSION PROCESS.

FOR MANY YEARS THE INDUSTRY HAS ALSO OWNED THE NEXT STEP IN THE CHAIN, THE EXPORT ORGANISATION WHICH IS, OF COURSE, THE NEW ZEALAND DAIRY BOARD. THE BOARD IS A TRADER AND IS ALSO A MARKETER OF A PROPORTION OF ITS PRODUCTS AND IN SOME INSTANCES, NOTABLY IN THE UK, HAS ALSO BEEN THE IMPORTER AND DISTRIBUTOR OF SOME OF ITS PRODUCTS. HOWEVER, UNTIL TEN OR FIFTEEN YEARS AGO THE VAST MAJORITY OF THE TONNAGE EXPORTED BY NZDB WAS BULK PRODUCT BEING SOLD THROUGH OTHERS IN COMPETITION WITH BULK PRODUCTS FROM OTHER EXPORTERS.

IN MORE RECENT YEARS THAT HAS CHANGED. THE INDUSTRY THROUGH NZDB IS PURSUING A STRATEGY BASED ON DIVERSITY OF PRODUCT AND MARKET AND CONTROL OF THAT PRODUCT AS FAR DOWN THE CHAIN AS IS POSSIBLE. IN ADDITION, THERE IS A CLEAR STRATEGY OF DEVELOPING THE INDUSTRY'S OWN PROPRIETARY BRANDS IN ORDER TO INSULATE ITSELF AGAINST THE EXCESSIVE FLUCTUATIONS OF THE COMMODITY TRADE AND TO ENABLE THE INDUSTRY TO MAKE FURTHER PROFITS OUT OF THE USE OF OTHER PEOPLE'S RAW MATERIALS IN THE RESULTING DOWNSTREAM INFRASTRUCTURE.

THE INDUSTRY'S INVESTMENT IN NZDB REPRESENTED BY ITS TOTAL RESERVES NOW STANDS AT \$1.2 BILLION AND THIS SUPPORTS AN ANNUAL LEVEL OF SALES OF AROUND \$2 BILLION. TO PUT THIS INTO PERSPECTIVE NZDB IS THE LARGEST SINGLE EXPORTER IN NEW ZEALAND AND EARNS CLOSE TO 20 PERCENT OF THE TOTAL FOREIGN CURRENCY DERIVED FROM MERCHANDISE EXPORTS.

THE INTERNATIONAL SUBSIDIARY AND AFFILIATE COMPANY NETWORK COMPRISES OVER 140 ENTITIES LOCATED IN 27 COUNTRIES WHICH HAVE A COMBINED VALUE OF OVER \$250 MILLION. THE TOTAL CONSOLIDATED SALES VALUE FOR THE GROUP IS \$2.7 BILLION AND IN THE YEAR JUST CONCLUDED IT WILL TRADE DAIRY PRODUCTS OF OTHER ORIGINS EQUAL TO RATHER MORE THAN 10 PERCENT OF THE VOLUME OF EXPORTS FROM NEW ZEALAND.

IN DEVELOPING THIS DOWNSTREAM NETWORK THE INDUSTRY HAS NEEDED TO OBSERVE A NUMBER OF PRINCIPLES FOR MAKING AND EVALUATING ITS INVESTMENTS. THE FUNDAMENTAL CONFLICT BETWEEN THE PRODUCER'S OBJECTIVE OF SELLING DEAR AND THE INDEPENDENT BUSINESS UNIT'S OBJECTIVE OF BUYING CHEAP IS RELATIVELY EASILY DEALT WITH AS BETWEEN THE MANUFACTURING CO-OPERATIVE DAIRY COMPANIES AND NZDB BY SIMPLY ELIMINATING ANY CONCEPT OF PROFIT AT ANY POINT OTHER THAN AT THE FARM.

BEYOND POINT HOWEVER, THE CONVENTIONS THAT OF INTERNATIONAL TRANSFER PRICING AS WELL AS THE MOTIVATION OF LOCAL MANAGEMENT TEAMS REQUIRES THAT SOME PART OF THE SELLING PRICES OF THOSE SUBSIDIARY COMPANIES IS RETAINED AS PROFIT AND IN SOME INSTANCES MUST BE RETAINED TO COMPLY WITH LOCAL EXCHANGE CONTROL REGULATIONS OR FOR THE FURTHER DEVELOPMENT OF THE BUSINESS. IN EVERY CASE HOWEVER, THE PROFITS SO EARNED AND RETURNED TO NEW ZEALAND ARE **REGARDED AS AN INTEGRAL PART OF THE TOTAL SELLING PRICE FOR** THE INDUSTRY AND THE EVALUATION OF THE INVESTMENT IS THEREFORE ON THE BASIS OF WHAT THE IMPACT IS ON THE NET RETURN TO FARMERS RATHER THAN THE MORE NARROW AND PERHAPS MORE CONVENTIONAL VIEW OF THE R.O.I. OF THE INDIVIDUAL BUSINESS UNIT.

RELATIVELY STRAIGHTFORWARD IN A CONVENTIONAL THIS IS INVESTMENT OF THE BRICKS AND MORTAR TYPE WHERE THERE IS AN PROCESSING PLANT, DISTRIBUTION INVESTMENT IN VEHICLES. WAREHOUSES AND THE LIKE. IT IS RATHER MORE DIFFICULT TO MEASURE AND EVALUATE WHERE THE INVESTMENT IS OF AN INTANGIBLE NATURE, WHETHER THAT BE THE PURCHASE OF AN IMPORT LICENCE IN A MARKET WHERE ACCESS IS RESTRICTED OR IN THE ESTABLISHMENT OF A BRAND. IT REQUIRES A WILLINGNESS BY PRODUCERS TO FOREGO CURRENT RETURNS IN ORDER TO BUILD NOT ONLY THE CAPITAL BASE OF THE INDUSTRY BUT ALSO THAT MOST IMPORTANT OF ALL MARKETING ASSETS, A CONSUMER BRAND.

A PARALLEL PRINCIPLE IS THAT THE INVESTMENT LINKS IN THE CHAIN OF VERTICAL INTEGRATION WILL ONLY BE SUCCESSFUL IF THE LINK IS WITH THE LAST PRECEDING LINK. THIS MAY SOUND SELF-EVIDENT IN THAT THE EXISTENCE OF AN EXTERNAL LINK EFFECTIVELY DEFEATS THE OBJECTIVE OF KEEPING CONTROL OF THE PRODUCT AND MARGINS AND LEAVES YOU VULNERABLE TO COMPETITION FROM BOTH THE FRONT AND REAR OF THAT PARTICULAR ENTITY. HOWEVER, THERE HAVE BEEN INSTANCES IN OTHER AGRICULTURE SECTORS WHERE ATTEMPTS HAVE BEEN MADE TO MAKE INVESTMENTS IN MARKETING VENTURES IN FOREIGN MARKETS WITHOUT THE INTERMEDIATE CHAIN BEING COMPLETE OR AT LEAST UNDER CONTROL AND NOT SURPRISINGLY, THESE HAVE FAILED.

IT IS ALSO A PRINCIPLE THAT NO SUBSIDIARY COMPANY WILL EVER BE ALLOWED TO COMPETE WITH NEW ZEALAND PRODUCT AGAINST NEW ZEALAND PRODUCT FROM ANY OTHER SOURCE. THIS MAY SOUND LIKE A CONTRADICTION OF THE BASIC PRINCIPLES OF COMPETITIVE EFFICIENCY BUT IT DERIVES FROM THE FACT THAT WE, AS AN INDUSTRY, ARE FACING ON THE ONE HAND INTENSE COMPETITION FROM OTHER PRODUCERS AND ON THE OTHER BUYERS WHO ARE EXPERT IN THE ART PLAYING ONE SUPPLIER OFF AGAINST ANOTHER. THE PRINCIPLE DOES NOT PRECLUDE A SUBSIDIARY COMPANY COMPETING WITH PRODUCT OF OTHER ORIGIN SINCE COMPETITION FROM THAT SOURCE WILL ALWAYS BE PRESENT AND IF OUR OWN COMPANY CAN BE THE COMPETITOR IT'S LIKELY TO BE MORE RESPONSIBLE AND TO YIELD PROFITS THAT WILL SUPPLEMENT RETURNS FROM THE SALE OF NEW ZEALAND PRODUCT.

HAS ALL OF THIS WORKED FOR THE DAIRY INDUSTRY?

SOME THEORETICAL ECONOMIC STUDIES FIND IT DIFFICULT TO BE CERTAIN ABOUT THIS BECAUSE THERE IS NO EXTERNAL COMPARISON AGAINST WHICH A MEASUREMENT CAN BE MADE. WHILST THIS IS TRUE IT IS NEVERTHELESS POSSIBLE TO OBSERVE THAT THE DAIRY INDUSTRY HAS SURVIVED THE MARKET TRAUMAS OF THE LAST FEW YEARS AND THE PROBLEMS OF AN EXCESSIVELY HIGH NEW ZEALAND DOLLAR EXCHANGE RATE RATHER BETTER THAN ANY OTHER PRIMARY INDUSTRY. THERE IS AN IMPRESSION HELD BY SOME THAT THE DAIRY INDUSTRY HAS HAD A RELATIVELY EASY RIDE VERSUS OTHER SECTORS SUCH AS MEAT AND MORE RECENTLY PERHAPS. KIWIFRUIT. BUT THIS IS JUST NOT SO. THE INDUSTRY NEVER HAD ANY SIGNIFICANT BENEFIT FROM THE OLD SMP REGIME AND IT HAS HAD TO DEAL WITH RESTRICTIONS ON ACCESS TO ITS TRADITIONAL MARKET IN THE U.K. THAT HAVE RESULTED IN AN 80 PERCENT REDUCTION IN SHIPMENTS OF CHEESE, A 50 PERCENT REDUCTION IN SHIPMENTS OF BUTTER AND A 100 PERCENT REDUCTION IN SHIPMENTS OF SKIM MILK POWDER TO THAT MARKET. IT HAS SURVIVED THE RISE IN SURPLUS STOCK DISPOSALS BY THE EEC AND THE US AIDED BY INCREASING EXPORT SUBSIDIES, THAT SAW MARKET PRICES EXPRESSED IN US DOLLARS FALL BY AROUND 50 PERCENT OVER A THREE YEAR PERIOD. IN SPITE OF ALL THIS, AND THE IMMENSE PRESSURES THAT IT HAS IMPOSED ON INDIVIDUAL PRODUCERS, THE INDUSTRY AS A WHOLE IS PROBABLY IN BETTER SHAPE THAN ANY OTHER AGRICULTURAL SECTOR IN THE COUNTRY TO TAKE ADVANTAGE OF THE IMPROVED MARKET OUTLOOK WHICH IS NOW BETTER THAN IT HAS BEEN IN THE LAST DECADE.

EVEN MORE IMPORTANT THAN THIS IS THE ATTITUDE OF FARMERS THEMSELVES WHO NOT ONLY HAVE AGREED TO THE INVESTMENTS THAT HAVE DEVELOPED THIS DOWNSTREAM MARKETING NETWORK BUT WHO ALSO TAKE PRIDE IN THE MULTINATIONAL BUSINESS WHICH THEY NOW OWN.

IN ORDER TO DEMONSTRATE HOW THE BOARD'S STRATEGY IS WORKING, AND HOW THE PRINCIPLES RELATING TO INVESTMENT IN MARKETING HAVE BEEN APPLIED, I WILL NOW LOOK AT A COUPLE OF SIMPLE CONTRASTING CASE STUDIES.

THE FIRST OF THESE RELATES TO OUR BUSINESS IN EUROPE AND THE SECOND TO OUR BUSINESS IN SOUTHEAST ASIA.

THE BOARD'S INVESTMENTS IN EUROPE ARE IN A GROUP OF COMPANIES THAT COMPRISE BOTH THE LARGEST AND LONGEST ESTABLISHED OF ALL. THEY COMPRISE TWO TRADING HOUSES, ONE BASED IN LONDON AND THE OTHER IN HAMBURG, AND A COMPANY BASED IN SWINDON IN THE UK ENGAGED IN THE MANUFACTURE, PACKING, MARKETING AND DISTRIBUTION OF A RANGE OF BRANDED CONSUMER PRODUCTS. THE LATTER COMPANY, ANCHOR FOODS LIMITED. IS ONE OF THE LARGEST UK DAIRY MARKETING COMPANIES AND IS RANKED IN THE MID THREE HUNDREDS OF THE "FINANCIAL TIMES" LIST OF THE TOP 500 UK COMPANIES. IT TRACES ITS HISTORY BACK TO 1922 WHEN NZCDC ESTABLISHED A SALES OFFICE THERE FOLLOWED BY A BUTTER PACKING FACTORY IN 1929. THE RESULTING PASSED то THE NEW ZEALAND DAIRY COMPANY PRODUCTS MARKETING COMMISSION, THE FORERUNNER OF THE PRESENT NEW ZEALAND DAIRY BOARD IN THE MID-1950S AND IN 1979 MOVED ITS HEADQUARTERS TO A NEW SITE WITH A FACTORY WHICH IS NOW ALMOST CERTAINLY THE LARGEST, MOST AUTOMATED AND MOST EFFICIENT BUTTER PACKING FACTORY IN THE WORLD. IN ADDITION, ITS DISTRIBUTION SYSTEM OWN NATIONWIDE AND IT HAS MANUFACTURES AND MARKETS A WIDE RANGE OF DAIRY PRODUCTS UNDER ITS OWN BRAND.

THE TWO TRADING COMPANIES ARE AMONGST THE TOP GROUP OF EUROPEAN DAIRY TRADING COMPANIES. THEY REPRESENT NZDB IN A TERRITORY THAT COVERS ALL OF CONTINENTAL EUROPE AS FAR AS THE SOVIET BORDER, THE MEDITERRANEAN, NORTH AFRICA AND WEST AFRICA AS WELL AS BEING SUBSTANTIAL TRADERS OF EUROPEAN PRODUCTS BOTH WITHIN EUROPE AND INTERNATIONALLY.

THE CONTRAST IN STYLES BETWEEN THE TRADING HOUSES AND ANCHOR FOODS TYPIFIES THE TWO LEGS OF THE BOARD'S STRATEGIC DEVELOPMENT. ON THE ONE HAND, THERE IS THE MARKETING AND DISTRIBUTION OF A RANGE OF PROPRIETARY BRANDED PRODUCTS AND ON THE OTHER THE CONTROL OF MARKETS THROUGH THE DEVELOPMENT OF DIRECT RELATIONSHIPS WITH END BUYERS AND THE SUPPLY OF SPECIALISED SPECIFICATION AND INGREDIENT PRODUCTS. THE MARKETING INVESTMENT HAS BEEN DIRECTED TO THE CREATION OF SPECIALISED BUSINESS UNITS, SHARPLY FOCUSED ON SPECIFIC MARKET SEGMENTS.

AS A MEASURE OF THAT INVESTMENT THE TOTAL TANGIBLE ASSETS OF ANCHOR FOODS ARE VALUED AT IN EXCESS OF ±30 MILLION STERLING PLUS THE EVEN MORE VALUABLE INTANGIBLE ASSET OF THE ANCHOR BRAND. THIS BRAND IS SUPPORTED BY AN INVESTMENT OF OVER ±6 MILLION P.A. ON ADVERTISING AND PROMOTION WHICH, GIVEN ITS ESTABLISHED POSITION OF MARKET LEADERSHIP, IS ABLE TO BE FUNDED FROM THE MARKET PREMIUMS THAT ARE BEING EARNED. IT IS A MATURE MARKETING COMPANY WITH ALL OF ITS PRODUCTS COMMANDING EITHER A POSITION OF BRAND LEADERSHIP OR THE PROSPECT OF ACHIEVING THAT IN RELATIVELY SHORT TIME.

IN THE HIGHLY COMPETITIVE UK RETAIL GROCERY TRADE, WHERE TURNOVER IN THE DAIRY CABINET ALONE IS OVER ±1 BILLION PER ANNUM, THE LARGE MULTIPLE RETAILERS TOTALLY DOMINATE THE TRADE. WITHOUT LISTINGS IN THE TOP FIVE RETAILERS WHO BETWEEN THEM CONTROL TWO THIRDS OF THE DAIRY MARKET NO SIGNIFICANT SALES CAN EVER BE ACHIEVED AND QUOTAS FOR ACCESS WOULD BE MEANINGLESS OR OF MUCH REDUCED VALUE. ALL OF THESE CHAINS WILL ALWAYS SELL THEIR OWN HOUSE BRANDS AND HAVE A POLICY OF CARRYING ONLY THE BRAND LEADER AND PERHAPS ONE OR TWO OTHER BRANDS IN ADDITION TO THEIR OWN ON THEIR SHELVES. AS A RESULT, IF YOU ARE NOT BRAND LEADER, YOU WILL INEVITABLY BE REDUCED TO HEAVY DISCOUNTING TO SECURE A PLACE ON THE SHELF AND THAT DISCOUNTING WILL ALMOST ALWAYS STAY WITH THE RETAILER AND NOT BE REFLECTED IN THE PRICE TO THE FINAL CONSUMER.

BY CONTRAST, THE BOARD'S SUBSIDIARY COMPANIES IN SOUTH EAST ASIA ARE RELATIVELY YOUNGER AND THE PROPORTION OF TRADE WHICH IS CHANNELLED THROUGH THOSE COMPANIES IN OUR OWN PROPRIETARY BRANDS IS SMALLER.

THE GROUP COMPRISES 16 COMPANIES LOCATED IN COUNTRIES RANGING FROM TAIWAN IN THE NORTH TO THE PHILIPPINES IN THE EAST, SRI LANKA IN THE SOUTH AND THE INDIAN SUB CONTINENT IN THE WEST. THE FIRST SUBSIDIARY COMPANY WAS ESTABLISHED IN 1974 AND THE AVERAGE AGE OF THE REMAINING COMPANIES IS UNDER FIVE YEARS. THE TOTAL ASSET VALUES OF THESE COMPANIES IS NZ\$70 MILLION AND THEY HAVE COMBINED SALES OF NEARLY \$300 MILLION. OVER THE NEXT FIVE YEARS THIS IS FORECAST TO RISE TO SALES OF \$600 MILLION AND THE SALES OF OUR OWN BRANDED PROPRIETARY PRODUCTS THROUGH THESE COMPANIES IS FORECAST TO RISE FROM THE PRESENT 72 PERCENT TO 90 PERCENT.

EACH OF THESE COMPANIES IS STRUCTURED TO COMPLY WITH THE CHARACTERISTICS OF THE MARKET IN WHICH IT OPERATES IN EXACTLY THE SAME WAY AS THE EUROPEAN COMPANIES. MANAGEMENT IS DECENTRALISED AND FOCUSED ON THE OBJECTIVE OF MAXIMISING RETURNS TO NEW ZEALAND.

THE SAME PATTERN CAN BE FOUND IN THE BOARD'S OTHER MARKETING REGIONS AND IT DEMONSTRATES THE WILLINGNESS OF THE INDUSTRY TO PURSUE THE STRATEGIES FOR INVESTMENT IN INTERNATIONAL MARKETING THAT HAVE BEEN SUCCESSFUL TO DATE. IT HAS COME A LONG WAY IN A RELATIVELY SHORT TIME BUT AS THE INDUSTRY DEVELOPS ITS DOWNSTREAM NETWORK, IT FINDS EVEN MORE OPPORTUNITIES FOR INVESTMENT TO ADD VALUE AND SECURITY TO PRODUCER RETURNS.

SO FAR, WE HAVE LOOKED SIMPLY AT HOW THE DAIRY INDUSTRY IS INVESTING IN INTERNATIONAL MARKETING. NO ATTEMPT HAS BEEN MADE TO ADDRESS THE QUESTION OF THE EXTENT TO WHICH OTHER AGRICULTURAL SECTORS COULD OR SHOULD, APPLY THE SAME STRATEGIES AND PRINCIPLES. IN SOME SECTORS SIMILAR INVESTMENTS HAVE BEEN SUCCESSFUL BUT IT IS QUITE LIKELY THAT IN OTHERS SUCH A STRATEGY WOULD BE IMPRACTICAL. HOWEVER, IT IS THE FIRM VIEW OF THE NEW ZEALAND DAIRY INDUSTRY THAT UNLESS PRODUCERS ARE PREPARED TO MAKE THE INVESTMENT IN VERTICAL INTEGRATION THEY WILL INEVITABLY BE LEFT IN THE UNHAPPY POSITION OF ACCEPTING THE RESIDUE OF THE PRICE PAID BY THE FINAL CONSUMER AFTER EVERY STEP IN THE CHAIN HAS HAD AN ADEQUATE RETURN ON ITS INVESTMENT AND THAT INVESTMENT

IN THE DEVELOPMENT OF RETAIL BRANDS IS SECURING THE FUTURE PROSPERITY OF THE BRAND PROPRIETOR, NOT THE PRODUCER OF THE RAW MATERIAL.

INTERNATIONAL MARKETING – PROSPECTS FOR STATUTORY PRODUCER MARKETING ORGANISATIONS

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SUMMARY

The statutory framework governing the activities of the producer marketing organisations is failing to encourage the development of a dynamic, efficient agricultural export sector. Statutory intervention should be reduced, made more flexible, and separated from commercial activities. It is proposed that statutory powers be transferred from the existing statutory marketing organisations to a single Producer Organisations' Authority.

Key Words: Statutory, Producer, Marketing, Boards.

Introduction

New Zealand's first statutory producer marketing organisations, or boards as they are generally known, were established during the period of economic turbulence and market instability that followed the first world war. They were based on two premises. The first was the proposition that statutory intervention can be used to regulate the relationship between New Zealand farmers and other domestic and overseas commercial interests, and that this is in the national interest. The second was the proposition that it is more equitable to allow producers to control other agents in their industries, than to allow those agents to dictate to producers. Neither of these propositions may be as acceptable today as they were in the early 1920s. Yet these are the two premises on which we are still constructing marketing institutions in the agricultural export sector.

However, any assessment of the possible future role of these boards needs to be based not only on historical and contemporary perceptions but also on a view of the market conditions, which the agricultural and horticultural export sector can expect to confront in the future. Therefore I should like to start this paper by offering a snapshot of the world to which we shall be trying to sell our food and fibre exports, during the last decade of this century.

The Changing Market Environment

It will be a world in which consumption and demand for food and natural fibre products will have increased dramatically. But the increase will not have been in those developed countries to which most of our exports have been directed in the past. The increase will be mainly in the newly industrialising countries and middle income developing countries, where a burgeoning and affluent middle class is already doing its best to emulate the consumption levels achieved by its counterparts in Europe and North America.

It will be a world in which the Gatt "Uruguay" round of multilateral trade negotiations may have helped to free up agricultural trade. But the negotiations will have had very little impact on overall patterns of world agricultural production. They will have had less impact than the political and economic pressures that are already causing major changes in European and United States agricultural policies and structures.

These changes will reduce some of the existing distortions in resource use, and may result in a marginal transfer of production away from the developed countries towards the developing world and the centrally planned countries. But a more significant consequence of current rationalisation will be increased concentration of production, in the developed countries, in the hands of large scale operators, with ready access to capital and to new technology. This potent combination of capital and technology, and consequent reductions in costs and increases in efficiency, will ensure continuing investment in agriculture and a continuing expansion of agricultural production in Western Europe and North America, as well as in other parts of the world. This is likely to be particularly true of temperate zone agricultural products, including dairy and meat production.

Competition at all levels, and in all food and fibre markets, will have become more aggressive, with a greater share of trade and distribution being channelled through vertically integrated international marketing organisations, like Nestle in the dairy sector and Dole in the fruit trade. The retail sector will be even more dominated by the large supermarket chains.

By the end of the century, consumers will be wanting more variety, but tastes will have become more sophisticated and more fastidious. Packaging, presentation and "convenience" will have become increasingly important product characteristics.

Within the next 10 to 15 years our bulk commodity markets in Western Europe for butter, lamb and apples, and possibly even for kiwifruit, will have all but disappeared. Hopefully they will have been replaced by an increasing number of smaller, more specialised niche markets, probably mainly located around the Pacific seaboard.

The Changing Domestic Environment

The increasing diversity of markets and market opportunities will be matched by increasing diversity of production and production systems, and the emergence of a much less homogeneous rural community as new enterprises attract new entrants into the farming industries. These new farmers and orchardists will be less beholden to, and less tolerant of, institutions whose accustomed statutory role has been to prevent all commercial or marketing activities except those specifically sanctioned by themselves. Thus impetus for institutional change is likely to come both from the market place and from the farming industries.

Important changes have also been taking place in the general economic and political environment. The creation of the SOEs as state trading organisations, at arm's length from the policy and regulatory arms of government, reflects the important principle that statutory powers should be separated from commercial activities. The debate about how the performance of the SOEs should be evaluated reflects heightened public awareness and concern over the costs associated with statutory intervention in commercial activities. These costs include not only the monitoring, enforcement and transaction costs associated with statutory activities, but also the direct costs to the taxpayer, the broader economic costs associated with the regulation of the industries concerned.

At the same time New Zealanders have become more sensitive to the equity and the economic implications of various types of statutory intervention in economic activity. Hence the talk of "level playing fields" and "referees and players". Today there is a better understanding of the problems and conflicts of interest that arise where an organisation is engaged in both statutory and commercial activities. Traders and regulators in combination produce mixed objectives, to the benefit of neither and generally to the considerable disadvantage of others.

The changing characteristics of markets and marketing systems, changing attitudes within the industry, and changing domestic economic and political perceptions, provide us with the backdrop against which to assess the future role of the producer boards.

The Statutory Framework

Since the boards are in fact creatures of statute, a key issue is whether there is a need for continuing statutory involvement in the agricultural export sector.

I do not believe that it is realistic, even in contemporary New Zealand, to contemplate an agricultural export sector devoid of statutory intervention. The reality is that our trading partners do not all share our zeal for economic purity. Consequently statutory provisions and mechanisms are required to allocate and to control export quotas in order to comply with quantitative import restrictions. The British butter quota, the EEC sheep meats arrangement and the Japanese and USA beef import controls are examples.

There are other situations in which some form of statutory underpinning becomes almost a condition of trade. Examples are market-sharing arrangements relating to geographic areas such as the Dairy Board's "understanding" with the EEC, or relating to the seasonality or phasing of supplies such as the Apple and Pear Marketing Board's arrangements in Europe and in North America.

More contentious are so-called "weak seller" or other market development type situations. Economists insist that the weak seller argument has no validity, arguing that in the longer term efficient pricing produces the most efficient allocation and use of resources. Marketers are equally adamant that weak selling can result in costs which, at least in the short term, can seriously disrupt market development. While I accept that there are circumstances in which the benefits from intervention in response to weak selling might exceed the costs, it seems to me that the aim of such intervention should be to remedy defects in the marketing structure rather than to protect the interests of existing exporters.

There may also be a case for the statutory underpinning of certain grading and quality control schemes where, for some reason, general provisions relating to the use of trademarks and brand names are not appropriate. However such arrangements should not be allowed to impede the export of products not claiming to conform with such national grading or quality control schemes.

There are a number of other areas of intervention provided for in the various statutes and regulations governing the boards, for example relating to storage and transport and the licensing of premises. I believe that most, if not all these powers are today unnecessary. If not abolished they should at most be reviewed from a zero base. It also seems unnecessary to enshrine in statute discretionary activities, such as those relating to the industry servicing and leadership functions of the boards.

In short, the situations in which there appears to be a general case for considering statutory intervention relate essentially to the restriction and allocation of marketing rights.

When marketing rights, or export licences are allocated, (whether because of import controls, or market-sharing arrangements, or a desire to prevent weak selling, or whatever) the recipients of those marketing rights expect to obtain some commercial advantage. Thus it should be possible in any particular situation both to test the strength of the argument for restricting marketing rights and to ensure an efficient and contestable allocation of export licences by calling tenders for such licences. Such a tender system would favour the efficient, genuine low-cost seller, incumbent or new entrant, whose price and profit expectations enabled him, or her, to bid a sufficiently high price in order to obtain a licence. It would also ensure the transmission of reliable market signals to producers, particularly if the tender system resulted in the establishment of a secondary market.

The Performance of the Sector and its Institutions

If it is accepted that there is a continuing need for statutory involvement the next question is whether the existing statutory framework is delivering an environment conducive to the development of efficient marketing systems and institutions.

The boards tend to point to their "successes" in the market place as justification for maintaining existing statutory structures. Success is a relative concept and the marketing success of an organisation can only be determined by comparison with what might otherwise have occurred — a comparison not possible in the case of monopoly organisations such as the boards. However, even if marketing "success" could be proven, it would not prove the suitability of the statutory framework within which the sector operates. Because Fletcher Challenge is successful does not prove that there is nothing wrong with New Zealand's tax laws. The fact that Brierley Investments made profits under price controls does not prove that price controls are "good".

More significant than the claims of individual boards are the hard statistical facts that show that the New Zealand agricultural export sector, as a whole, has been out-performed not just by its competitors but by many other countries over the last 10-15 years.

Between 1970 and 1980 the policies of successive New Zealand governments were firmly directed towards expanding agricultural production and increasing agriculture's contribution to foreign exchange earnings. Yet, "while the nominal value of New Zealand agricultural exports grew between 1970 and 1980 at less than 13% per annum, the comparable figure for the U.S.A. was 19%. Other examples of countries with higher rates of growth of agricultural exports than New Zealand included: Chile 25.3%, South Korea 23.3%, Thailand 21.1%, EEC 19.0%, Indonesia 18.9%, Malaysia 17.8%, Columbia 17.7%, Brazil 16.9%, Israel 16.2%, South Africa 15.9%, West Europe (non-EEC) 15.4%, Philippines 15.0%, Australia 14.7%, Turkey 14.5%, Argentina 14.3%, Ecuador 14.2%, Pakistan 14.0%, India 13.8%, Yugoslavia 13.4%. Countries with

lower rates of agricultural export growth included Japan 10.7%, Eastern Europe/USSR 9.6%, Low-income Africa 8.9%, Guatemala 8.3% and Sri Lanka 7.4%.¹¹

Institutions in the agricultural sector cannot be blamed for government policies that have inhibited domestic economic adjustment. Nevertheless, the statutory boards have been dominant actors in a sector which, overall, has not proved sufficiently responsive and competitive in the context of changing world market conditions.

Over the last 60 years, the boards have made a major contribution to the development of the agricultural sector, and the New Zealand economy. More recently however, as markets have become more diverse and more competitive, the deficiencies of these institutional structures have become more apparent.

Statutory monopolies do not face the same incentives as competing private firms to engage in the market discovery process. As a consequence they are generally not so good at achieving innovation, diversity and cost-effectiveness in marketing methods. They tend to rely on economies of scale and single, standardised marketing systems as the means of achieving greater efficiency. They are less able to adjust quickly as markets change and become more diverse and competitive. It is significant that over the years, the Dairy Board has responded to an expanding range of products and markets, and increasing competition, by decentralising its profit centres and its marketing operations. It now has over 40 offshore subsidiaries and affiliates. It might be interesting to speculate about the roles that the Dairy Board and the Apple and Pear Marketing Board could have played in the development and restructuring of the meat industry and other horticultural industries if freed from statutory constraints; notwithstanding that they would have had to compete in the market place rather than in lobbies and in courtrooms.

Another problem for institutions such as the Dairy Board and the Apple and Pear Board derives from the failure of the relevant statutes to distinguish between the role of the producer as a supplier, and his role as a shareholder. The fact that profit on the sale of Lada motor cars results in an increased milk fat payout rather than a dividend gives the milk producer a very distorted market signal, and no help in assessing the commercial efficiency of the Dairy Board or in deciding how his own scarce capital resources should be deployed.

If New Zealand exporting organisations, whether boards or not, are to compete successfully in the future it seems important that they be given the opportunity to become stronger, more diversified, more vertically integrated and more multinational in their corporate and marketing strategies. This seems more likely to happen if they are freed of their statutory responsibilities, and constraints.

The OECD has accumulated and published a great deal of evidence showing that a sluggish response to changing market conditions is usually associated with over-regulation, lack of transparency and lack of adjustment in the sector concerned.²

In the New Zealand agricultural export sector it is not hard to find potential candidates for an OECD hit list. We have export licensing systems that favour incumbents and discourage new entry. We have price pooling systems that blur the market signals to which producers are expected to respond. We have preserved consignment selling practices that perpetuate a state of insecurity for our farmers and orchardists. In fact we have persisted in organising the sector on the basis that the individual has no exporting rights unless these are specifically allocated. Moreover the allocation is by people who represent existing incumbents, be they growers or exporters. Such a structure has been shown time and time again, in many parts of the world, to militate against the functioning of what the OECD has termed "positive

¹ Woods, R., Graham, K., and Rankin, P. (1984). Towards a Strategy for New Zealand Agriciture, pp.47-48. N.Z. Planning Council.

² See for example "Positive Adjustment Policies. Managing Structural Change." OECD, 1983.

adjustment", and the contestable market discovery process which leads to the rapid elimination of inefficient marketing systems and practices.

I believe that, after examining OECD experience and studying New Zealand legislation, a disinterested observer would be expecting to find a relatively poor performance from the New Zealand agricultural export sector. He, or she, certainly would not be surprised by the figures I have already quoted, or by the problems and disputes now being experienced in the kiwifruit industry, the pip fruit industry and the meat industry.

In fact it probably would not surprise such an observer to learn that recently the taxpayer had been obliged to write off dairy industry debts of over \$600 million, and meat industry debts of over \$1000 million. While the precise causes and consequences of these huge debts can be debated, their existence, and the need for their forgiveness at least suggest the possibility of serious defects in industry structures and in resource allocation, both within the agricultural sector and between that sector and the rest of the economy.³

Alternative Structures

If responsibility for statutory functions were to be transferred to some other body, the existing boards would be free to evolve either into public companies, or into trade associations, or both. Without statutory responsibilities the boards would be no longer public sector organisations and would be able to develop their own commercial and political structures and strategies without the constraints and responsibilities imposed by specific statutes.

Removal of their statutory powers would result ultimately in all the rights, functions and activities of the boards becoming contestable. However this does not imply the demolition of existing successful marketing structures. Marketing organisations such as those of the Dairy Board or the Apple and Pear Marketing Board would only be threatened if they were unable to produce a satisfactory commercial performance, and if they were unable to justify to an independent authority the types and levels of statutory intervention they considered indispensible to such a performance.

If the boards were to be divested of their statutory powers, the question arises as to whether government should assume direct responsibility for all statutory intervention in the sector, or whether responsibility should be entrusted to one or more separate, independent authorities.

I doubt that direct intervention by government would be the best solution. Experience has shown that when governments go beyond the exercise of a purely regulatory role in agriculture, political expediency rather than economic exigency becomes dominant. In New Zealand the relative size and significance of the agricultural and horticultural export industries are such that policy decisions and interventions relating to the sector have far-reaching and long term economic, marketing and structural implications, not just for the sector but for the economy as a whole. The consequences of the SMP schemes introduced in the late 1970s provide a graphic illustration of the extent to which badly targeted and ill-prepared statutory interventions in the agricultural sector can damage the rest of the economy.

Objectivity, transparency and political neutrality are needed to ensure that statutory intervention in agricultural export marketing is conceived, administered, and accounted in an acceptable manner. In order to achieve this goal it seems preferable to vest the appropriate regulatory powers and responsibilities in an independent authority, or authorities, operating at arm's length not only from the particular producers, exporters and other existing interest groups, but also from government.

One possibility would be to provide specific legislation, and a separate statutory authority, for each individual product area. However such an approach has its own dangers. Even if kept at arm's length from

3 For a discussion of Australian experience with statutory marketing boards see "Statutory Marketing in Agriculture: Some Uses and Abuses", Sieper, E. Agpol (1983), NZIAS.

trading and commercial interests such authorities would be vulnerable to capture by groups concerned to protect existing interests. Moreover it is hard to see how such a structure could avoid creating the kind of statutory straitjacket that we are attempting to eliminate.

The need is to provide a framework which will allow maximum flexibility both in the development of commercial structures and in the way necessary statutory intervention is delivered.

Another possibility would be to create a single authority through which all regulatory legislation affecting the agricultural and horticultural export sector could be developed, monitored and implemented. In practice such an authority would act as adviser to the appropriate government minister, who would still retain ultimate authority for statutory intervention in the sector.

Such a body, which might be called the "Producer Organisations' Authority", would be concerned exclusively with regulatory matters. It would be constructed so as to ensure both its professional and technical competence, and its independence from individual product interest groups.

Should the Authority be required, in addition to its regulatory functions, to administer specific on-going control schemes, e.g. grading or quality control schemes, it would let contracts to technically competent organisations to undertake such work. The existing boards would obviously be candidates for such contracts.

Conclusion

In a diverse and ever-changing world there is an almost infinite range of products and markets. There is no single marketing strategy and no single institutional structure that can be applied universally. Each market for each product is different. Technological and economic developments ensure that all markets are constantly changing. Laws and regulations, and the institutions and conditions they create, do not change, and cannot be changed in this manner. This is a compelling reason for keeping statutory intervention in agricultural export marketing flexible and minimal.

The survival of New Zealand's agricultural and horticultural export industries depends on our ability to provide an environment that will ensure the most efficient and equitable means of matching resources to choices; that will encourage dynamic market discovery; that will be conducive to rapid and competitive adjustment; and an environment that requires individuals, and institutions, to think how best to **manage** change, rather than how best to **resist** change. Our statutes and our institutions are not providing such an environment at the present time. Therefore changes are required.

It is in the national interest, as well as in the interests of producers, processors, exporters and other parties directly involved that the exercise of statutory power should be separated from trading and commercial activities. It is in the interests of all concerned, and particularly producers, that all the trading and non-trading institutions on which the sector is dependent should become more contestable. A Producer Organisations' Authority may provide the best vehicle for delivering whatever statutory support is needed.

Given the right commercial and statutory environment each product area will be able to develop its own institutions, its own marketing systems, with its own, carefully targeted statutory support mechanisms where these are required. In such an environment the existing marketing organisations, restructured as corporations, would be better placed to pursue effective, dynamic, contestable, corporate and marketing strategies.

CONTROLLING EXPORTS: THE ROLE OF MARKETING BOARDS

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Paper presented at the Conference of the New Zealand Branch of the Australian Agricultural Economics Society, Blenheim, 1988

Introduction

In recent years there has been an ongoing debate and considerable discussion about the role that Producer Marketing Boards can in the exporting of our play agricultural and horticultural products. The urgency of this debate has been heightened by the market pressure which exists for almost all of our major export products, and the within Zealand. changing economic environment New Unfortunately, this discussion has frequently become polarised between the extremes of a marketing perspective and free market economics.

From a marketing viewpoint, increased levels of control over export marketing required to implement are more sophisticated marketing strategies which can increase returns to these industries. On the other hand, many economists would argue that this increased level of control can only incur costs by imposing limitations on access, and the removal of contestability in the market place.

These points are argued from widely differing theoretical perspectives, and with a lack of hard empirical information there is a danger that decisions will be made from philosophical perspectives rather than carefully reasoned arguments about the sources of costs and benefits.

considerable body of knowledge in the There is а microeconomic, marketing, and industrial organisation theory which can be used to shed some light on these issues. For example, there appears to be a growing recognition even in the international trade theory that there can be benefits from specific interventions (Krugman, 1987). Likewise, marketing theorists recognise the importance of pricing 1984) structures (Rao. and distribution-channel power structures in the implementation of marketing strategies (Martin, Rae and Zwart, 1986).

My aim in this paper is to review some specific aspects of these arguments from a more rigorous economic perspective. The price discrimination framework is used as an economic marketing behavior to focus more model of aggregate carefully on the possible benefits from increased control. The ability of competitive markets to capture equivalent benefits, concerns about resource allocation and weak selling are also discussed in some detail. The discussion does not cover all of the issues involved in the debate, particularly the costs of intervention, but these arguments are well understood by economists. The concerns identified however, are central to the debate and hopefully this discussion will lead to a more careful consideration of the total economic costs and benefits involved.

Can increased control lead to increased returns?

One of the key issues is whether control over marketing can in fact increase returns over and above that which might be expected from competitive exporter behaviour.

It is well recognised that firm level marketing strategies rely on the identification and targeting of specific market segments. Each segment requires an appropriate product, promotion, distribution, and pricing policy. The first three of these factors involve expenditures and it is the pricing component of the strategy which must be relied upon

to capture the returns. While a wide range of methods may be used to set prices, they inevitably involve the principles of price discrimination across segments.

The industrial organisation literature has also identified the importance of such behaviour and its linkage to market structure and behaviour (Philps, 1983). This more general approach treats an individual firm as a discriminating monopolist which may use marketing instruments to provide opportunities for discriminatory pricing in imperfect markets.

Martin (1987) and Martin and Zwart (1988) have specifically addressed the issue of price discrimination at the industry level for agricultural commodities. In a generalised model it was shown that the ability to allocate product to individual market segments in such a manner that marginal revenues are equated across segments, would be sufficient to ensure that average returns could be increased above the competitive level. It was demonstrated that these benefits depend on the fact that the demand elasticity for New Zealand products differ across market segments and that arbitraging behaviour is not possible. With a singleselling agency, arbitraging of New Zealand product by overseas firms is not difficult to control, but it may be difficult in some cases to prevent arbitraging with product This matter is discussed in the from other sources. following section.

The analysis also incorporated the fact that New Zealand producers would respond to increased average revenues by increasing production. Even allowing for this it can be seen that as long as supply curves were upward sloping there would be increased revenue to the industry as a whole.

The aggregate results of this analysis are presented in Figure 1. Curve D represents the aggregate demand curve summed over all markets and it was shown that for the case



revenue (AR) which of linear demand curves the average from the individual results from the pooling of returns lie to the right of markets with price discrimination will the aggregate demand and is asymtotic to that demand. Thus. price and quantity combination Point a would represent the from competitive pricing and Point b represents the returns It is obvious that these from optimal price discrimination. single selling marketing returns could be captured by a agency and that they differ from the activities of a simple monopolist which would price at Point c or a discriminating Point e. The monopolist which would operate latter possibilities would require either export quotas or optimal export taxes and they are potentially more distortionary from the markets differ because average revenues considerably from marginal costs of production. In the case however, there is no of the single selling agency production level as the misallocation of resources at the marginal revenue to the individual producer is equated with marginal cost.

It is apparent from this analysis that the returns from competitive export pricing would represent the lower bound of possible returns which could be captured by a single selling agency or some other mechanism which allowed price discrimination. The upper bound of these returns will be determined by market conditions and competition in the It can be argued that if the markets are overseas markets. large and the products are homogeneous, then it would be impossible to discriminate between the markets. Any attempt to charge higher prices in individual segments would result in a competitive reaction from other countries which would continue until prices were equated. While such conditions are often assumed to exist for agricultural products in aggregate, the conditions for individual products can be considerably different.

Does the demand for New Zealand products differ between market segments?

In the current world markets for our agricultural and horticultural exports where products are not always homogeneous, there can be a certain degree of market power, and demands can be influenced by marketing activities. Unfortunately, the extent of these possibilities have not been carefully measured or evaluated, but some of the more likely circumstances are described below:

1. Where there are voluntary quotas, government buying agencies and possibly other forms of restrictions in export markets, then it is generally accepted that returns can be increased by capturing rents associated with the inelastic demands .in these markets. It has also been noted that there are a wide range of alternative mechanisms including taxes, and subsidies or could fulfill this tendering arrangements which function.

Probably the only advantage of a marketing board in this situation would be the savings on transaction costs where prices are already pooled from other markets. These savings would arise from both administration costs, and also increased continuity of arrangements associated with practices such as tendering. Other methods of capturing these rents such as the voluntary cooperation currently used in the meat industry, could impose costs through the need for market sharing agreements which can influence the incentives for market development (see Zwart and Martin, 1988).

2. New Zealand's dominance in the market for particular products may also provide opportunities for price discrimination. For example, this would have been the case for kiwifruit in past years. For substantial gains to exist it is necessary that overseas competitors are unable to expand production sufficiently to arbitrage

away the price differences between markets. This is more likely to occur with new products and especially where New Zealand has some control over the genetic material involved. Because of the large production lags in agriculture and horticulture, these advantages may be considerable and should not be ignored, but obviously, such benefits would be eroded as competitors increase production and produce imitative products.

These benefits are equivalent to the competitive advantages which are continually sought by oligopolistic firms in other markets. Control over New Zealand export destinations can enhance these returns, by eliminating the arbitraging activities of domestic exporters who would have greatest access to product and genetic material, and by making it possible to exploit the differing demand conditions in individual markets. It appears that the Kiwifruit Authority did in fact implement such a strategy by requiring exporters to divert product away from specific markets.

3. Any features a product which allow it to be of differentiated from products from other sources provides the potential for price discrimination, and a focus for While the possibilities marketing activity. might and include such things as grading, appear numerous, product modification. packaging, varieties, and distribution channels, there may be little value where the modifications can be readily imitated in overseas markets.

One of the features which cannot be imitated is the New Zealand source of the product, which along with the attitudes towards our country and its other products, can provide a basis for market segmentation. Our geographical location and the timing of production along with the disease and pest-free nature of some of our products, already provides considerable advantage for

products such as beef and some individual horticultural products. It can be argued of course, that competitive New Zealand exporters could also exploit many of these opportunities but there is likely to be a substantial difference in the marketing strategies which they would adopt. Because of their competition for a share of the New Zealand crop they also have a need to differentiate their product from that of other exporters, rather than that from other countries. This form of differentiation is very different and is less likely to increase the returns for the total crop. It has been argued elsewhere (Zwart, 1988) that competitive exporting firms are unlikely to capture these benefits because of the cost structure of the industry and the nature of the contractual arrangements used.

Similar arguments lie behind the case for a national brand which has been made in many industries. In marketing practice it is common for brand creation to occur where product differentiation is at its greatest to allow marketing effort to have the most impact. Because food products are frequently identified with their country of origin, there can be considerable advantage in developing a scale of branding which could not be captured by individual exporters with competitive pricing, but could be captured by discriminatory pricing at the national level.

4. Perhaps some of the major opportunities lie in price discrimination across product forms. In this case market segments relate to the independent demands for products from alternative processes or product forms. Examples include, the range of products produced from milk, juicing of fruit, the rendering of sheepmeat, and the production of different varieties of apples. These products are produced under competitive market conditions, but the ability to control the production mix, as occurs with the Dairy, and Apple and Pear Board,

provides opportunities to price discriminate by equating the marginal returns to the raw product across the consumer markets for the finished products. It is not difficult to show that in these circumstances returns can be increased by altering the production mix away from that which would occur in the competitive market.

in agricultural production to have It is not uncommon lower priced, but elastic markets which can absorb particularly larger quantities and fluctuating quantities of products which would normally disrupt marketing strategies in more price inelastic markets. In cases such as the dairy product trade it would be expected that competition from other countries would ensure that consumer prices would be lined to the competitive differentials but in fact, these markets are distorted to a very large extent by government policies in other countries which probably only enhances the opportunities for this type of activity.

The Apple and Pear Producers Board have been criticized for restraining production of some of the higher priced new varieties but such a policy could in fact be efficient as a part of a price discrimination strategy across all varieties. It is not surprising that private exporters viewing this situation of lower producer prices and higher prices in export markets, would suggest that such an activity is clearly inefficient from a competitive market perspective. As part of a price discrimination strategy however, this could be an optimal strategy from both the industry and national viewpoint, in which the producers are rewarded for higher average returns over the total apple crop.

The points outlined above describe some of the means by which increased control of the export destinations and product mix can be used to increase returns. Some of these principles are already used in existing industries, but their importance has not been clearly defined.

Although the principles of price discrimination are firmly based on economic theory, they also form the basis of pricing strategy in marketing theory. The other instruments of the marketing strategy such as product development, promotion, and distribution system, are primarily used to support and identify this differentiation between segments.

Could competitive firms capture the same benefits?

In the situations described above it would be difficult for competitive exporting firms to capture the equivalent benefits. The presence of competitive firms with access to the same raw product would remove many of these benefits through short-term arbitrating activity which would equate returns across market segments. Although the potential would appear to exist for these firms to differentiate their product and develop sophisticated distribution systems, this has not been observed to occur in the markets where such conditions exist. The fact that most exporting companies ship products to a wide range of countries, and the prevalence of commission selling, indicates the short term competitive focus of such firms. This is probably not surprising in an industry which appears to have low entry costs and no economies of size. The lack of innovation in market development in such markets is not a unique feature of our agricultural exporting environment.

Krugman (1987), in discussing the case for intervention in international trade, suggests that external economies associated with fixed costs of aquiring knowledge in markets where products can be easily imitated, can prevent firms from appropriating the benefits of such investment. This reasoning parallels the commonly stated arguments made by New Zealand exporters about the lack of market development in markets there is excessive competition.

In an even more general context, there is continuing debate about the relationship between economic literature in innovation and market structure (Kamien and Schwartz, 1982). Schumpeterian hypothesis that the While the original presence of monopoly power enhances innovation, has not been It is well recognised that the pressure openly accepted. for innovation is a balance between the demand pull or the technological economic opportunity stimulus, and more concentrated research opportunities created from activity. It is these relationships which have strengthened the case for patent rights as a means of allowing firms to capture benefits from research activities. If there is any parallel at all between generalised innovation and market development activities, then we must be guarded in making the degree of innovation assumptions about which can be expected from competitive export marketing.

In a more specific case Chiang and Masson (1988) have shown how the competitive exporting of near homogeneous products can lead to sub-optimal quality. The study demonstrates that because of the problem of "statistical discrimination" by consumers, individual firms may have little incentive to unilaterally upgrade their quality levels. They further suggest that a country may be able to raise its welfare through intervention which leads to industrial consolidation or by limiting export rights.

These theoretical studies all highlight the fact that a simple competitive exporting structure may not fully capture all of the potential returns from exporting activity. Competitive exporting may have the virtues of cost efficiency and freedom of opportunity, but under these conditions it is probably unrealistic to expect to find a high degree of sophistication in marketing.

It is commonly noted that there are many examples around the world of multi-national food processing and wholesaling firms which have developed very sophisticated marketing

strategies which appear to be similar to those I have These firms do operate in a competitive described earlier. environment, but there is a substantial difference in their orientation. As noted by McKinlay (1987) and Coopers and Lybrand Associates (1988) these firms have developed a close interaction with multiple retailers and utilise their access to a wide range of alternative sources of supply. While in cases they have developed tight contractual many the longer term they are relationships with suppliers, in still involved in capturing the benefits from arbitraging If our concern is with maximising between the suppliers. returns to New Zealand agricultural resources, then these firms can only be viewed as an essential part of a competitive exporting system, and cannot be expected to confer any benefits from the capture of rents associated with marketing activity.

Are resources missallocated by controls?

In the recent report prepared for the Economic Development Commission, Woods (1988) makes a major point of the fact that exporting marketing performance from New Zealand has been effected by the presence of statutory organisations. While this appears to suggest that there have been aggregate misallocations of resources, the conclusion is not adequately supported by any data which is presented in this study concerned, and is not related to the varying levels of intervention in the different markets.

The same study raises more substantial concerns about the nature of the price signals which producers receive, particularly from the single-selling marketing boards. McKinlay (1987) makes the same point with respect to the prices for grades of apples. In fact, as previously discussed, there are very clear reasons why, under a price discrimination marketing strategy, a producer board may find it necessary to reward producers at a level lower than market returns for products which have inelastic demands.

At the same time, products with lower market prices and more elastic demands would be expected to receive higher than market returns. Such behaviour simply reflects the process of managing the production mix to maximise aggregate returns. A similar process appears to be involved in the pricing of dairy products between the Dairy Board and producer cooperatives.

The observation of such price differentials are frequently a concern to potential competitive exporters who observe the possibility of short-term trading profits. This possibility is also one of the reasons why it would be extremely difficult for an individual firm or a voluntary association between either exporters or producers to capture benefits from price discrimination. As has been noted by Zwart and Martin (1988) there would be very strong incentives for free riding.

Another common concern with a discriminatory pricing strategy is that it can lead to a situation where average returns are considerably higher than marginal returns or prices in some particular markets. This observation often leads to a suggestion of a need for two-part pricing to minimise marginal production. Two-part pricing would undoubtedly lead to higher returns for the industry as a whole by 'moving further the towards discriminating monopolist situation shown in Figure 1. Unfortunately, the difficulties involved in identifying the marginal producer will often lead to increased administration and transaction costs of such a pricing policy. A logical extension of this argument is to proceed to a production control policy which limits access to an industry. Management of such institutions are known to lead to larger resource allocation difficulties (see for example, Veeman (1987) and, Saint-Louis and Proulx (1987)). Such policies have tended to develop where the primary concern is the increasing of producers returns but they can be highly distortionary from a national perspective.

There seems to be little reason why price pooling across market segments should lead to any production distortion at the aggregate level. It can be seen from Figure 1 that the pool price or marginal return to the individual producer would still be equated with the marginal cost of production. There would be no misallocation in a situation where producers supply a uniform product to the marketing system, and this would also be true where producers provide an average mix of non-uniform product. While it is argued that producers who wish to produce the products that have the highest market price should be duly rewarded for their initiative (Woods, 1988}, this must be seen as an overall part of the marketing process which can increase returns to an industry as a whole.

Another concern shared by both McKinlay (1987) and Woods (1988)is that returns from ancillary activities of marketing organisations could become confused with returns from raw products. The obvious example is the Dairy Board which is now involved in a wide range of activities which extend well beyond dealing in dairy produce. I believe that this is a major area of concern which is worthy of further consideration. Where these activities are integrated to the marketing or access arrangements for dairy products, then it could be seen as an extension of the former problem. Where such activities are clearly unrelated and can be treated as independent profit centres then there may be more reason for concern. Presumably this becomes an alternative to other investment activities and raises some concerns about ownership of assets and liabilities of individual producers.

<u>Is weak-selling a problem?</u>

One of the most common arguments for producer board intervention in marketing has been the need to overcome the problem of "weak-selling". In a recent paper on this topic, I have suggested that the importance of this issue has probably been overstated in this debate (Zwart, 1988). It is

argued that changes in competitive markets structures and the growing dominance of multiple outlets has led to an overseas increasingly unstable pricing environment in market based responses which could markets. There are overcome this problem including: increased access of multinational firms to New Zealand. alternative forms of contracts between producers and exporters, and an increased level of intermediate exchange of product between exporters. that agencies such as single-sellers While it is obvious could overcome this problem, this in itself would be insufficient reason to advocate such organisations.

It is unfortunate perhaps that discussions about weakselling have often become confused with more general issues about the shortcomings of competitive market structures that I have described in this paper. For example, Woods' (1988) description of hit-and-run marketing is not a problem of weak-selling, but one of externalities associated with marketing activity that I have already described.

The dangers of a compromise

In attempting to obtain a balance between a control over marketing, and the contestability of competitive markets, a range of alternative marketing structures have been proposed and implemented over the years.

One of the most common mechanisms used has been the licensing of exporters. It is argued that limiting the number of exporters can increase the control over marketing strategies through the coercive threat of delicensing. However, as long as exporters are to remain competitive there are obvious pressures for all exporters to maintain their short-term arbitraging activities across all market segments. This could prevent the capture of any of the benefits which have been discussed above.

In meat and kiwifruit marketing, voluntary market allocation schemes have been developed in an attempt to overcome these problems. It has been necessary however, to ensure that all exporters are represented in each market segment in order that no particular companies have an advantage and these schemes have usually been based on the exporters share of New Zealand production. While such schemes have the potential to capture these benefits, they may result in costs associated with the duplication of distribution channels, complex administration systems, and a weakening of incentive to promote products and develop consumer the brands. Some of perceived difficulties in the current meat marketing system are discussed in Zwart and Martin (1988).

Other possible compromises have involved the tendering of access rights to particular market segments (Woods, 1988). This alternative overcomes the problem of duplication and allows for more focused marketing effort in a particular itself involves segment but the tendering process transaction costs associated with the discontinuity of tenure for any particular firm. A more useful alternative might be the creation of individual firms which have tradeable shares, and sole access rights for these markets. relatively smooth transition This would allow a from existing more controlled institutions such as Devco and Janmark, and still introduce contestability of management.

While such solutions may be appropriate for premium markets particularly on an individual country basis, it is not obvious how lower priced or disposal markets, and discrimination over product form, could be handled on an equivalent basis.

Compromise solutions which involve some aspect of control, whilst retaining contestability, may have their own costs associated with inefficient marketing strategies and the distortion of incentive structures. There is certainly no simple or obvious solution between the extremes of

- 15 -
competitive markets and single selling, and it will be necessary to review individual cases carefully.

Conclusions

In raising some concerns about the marketing board debate I have purposely focused on the potential benefits that producer boards could capture from increased control over A price discrimination framework has been used trade. because this reflects the means by which any universal for agricultural or horticultural marketing strategy products would lead to increased producer returns. It is necessary for these points to be raised because other studies have either tended to focus on costs associated with statutory intervention (Woods, 1988), or expressed the case for marketing intervention in terms of eliminating weakselling, or even more general arguments about cooperation and coordination of marketing activities.

I have noted that the potential returns from an optimal strategy would be greater than that which could be obtained under competitive export marketing, but against this must be offset the complex issues of property rights and risks of The benefits outlined will vary between mismanagement. industries and will depend on the opportunities to differentiate products and discriminate prices across market segments. It is probably for these reasons that we have seen the acceptance of single-selling in the Dairy and Apple and Pear industries, and not in Meat and Wool.

Where it is accepted that such interventions are justified, it is essential that there is adequate monitoring of the agencies created. This should involve producers who are probably most directly influenced, but also the government where statutory rights are involved. Government monitoring of the performance of such agencies appears to have been limited in the past, and information has often been unavailable for supposedly commercial reasons. The costs of

this monitoring however, are an essential part of the costbenefit equation, and it is possibly our inattention to this fact which has made a careful analysis of the costs and benefits difficult. It is hoped that the discussion in this paper will contribute towards providing a framework for a more careful analysis of some of the factors involved by providing an economic framework for evaluating aggregate marketing strategies.

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COMMODITY MARKETS AND NZ EXPORTS¹

by

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SUMMARY

This paper examines the proposition that key information on the performance of New Zealand export commodities can be obtained from analyses of the collective behaviour of commodity markets in general. There appear to be limits to this source of information based on problems with errors of aggregration, lack of supply side information and long term trends. Continuation of individual commodity market analysis by markets is recommended.

Key Words: Prices, Commodities, Demand, Supply, Technology.

INTRODUCTION

This paper is concerned with the setting of prices in primary commodity markets, particularly as those prices affect New Zealand exports. The general proposition examined is whether the collective behaviour of commodity markets can provide information on the returns from the particular set of commodities that New Zealand produces. The idea of examining the markets in isolation relates to identifying market trends independently of exchange rate and inflationary changes within New Zealand. The latter effects are usually incorporated in domestic measures of competitiveness or the domestic real exchange rate (Johnson, 1988; Cooper, 1988). In this paper, measures of international competitiveness or the real exchange rate are discussed in the light of available information on commodity prices and markets. This paper is thus complementary to an earlier paper given to this Society (Johnson, 1981).

COMMODITY MARKETS

Commodity markets are characterised by largely free, world trade of standardised products. Prices are set by normal forces of supply and demand and adjustment is normally fairly rapid. Products entering world commodity trade, however, are highly heterogenious, with different production conditions and cycles, different patterns of demand and end-use, and each subject to its own pattern of technological development. Commodity market analysis is based on a search for common elements among these many diverse patterns.

This can be contrasted with individual commodity market analyses where particular variables can be isolated concerning production,

1. I am indebted to my colleagues at Massey University and Ralph Lattimore for numerous discussions of sections of this paper. The usual caveat applies. demand levels, prices of substitutes, technological change and income growth. They are usually confined to one country market. They are useful because they provide the bulk of the available information on supply and demand and income elasticities and the conduct and performance of individual markets. On the other hand, commodity market analysis uses a more aggregative framework to examine markets as a whole and their relationship to the rest of the economy (ABARE 1988).

On the demand side, important common factors affecting commodity prices include economic activity in major industrial countries (endusers) and the growth of income. Particular groups of commodities, like metals may relate better to changes in industrial production than national income (see Graph.1). It is well recognised that demand for individual commodities can be organised in a hierarchy of income elasticities which suggests grouping of commodities on the basis of their income elasticities of demand.

On the supply side, changes in production can sometimes be more important than changes in demand. Short term changes may be caused by the vagaries of the weather. Longer term changes are caused by the impact of technology discussed below. In agricultural crops there is normally a one year cycle of production and adjustment (except in monsoon countries with 2 crop cycles per year) but in the perennial crops and livestock, production and adjustment can take several years to work through the system. Finally holdings of stocks (voluntary or involuntary) are likely to have decided market influences (ABARE, 1988).

The role of technology on the demand side is to alter the end-use requirements for commodity inputs. There is apparently a long-term downward trend in metal fabrication for manufactures which clearly will affect market demand in the longer term (Drucker, 1986) (World Economic Survey, 1987) (Economist April 18, 1987). On the supply side, the long term effects of technology on production in agriculture and mining are well known. What needs to be emphasised is that technology tends to be absent from short-run analyses of commodity price fluctuations, while it remains an important component of longer run price levels (Economist, April 18, 1987).

DATA SETS AND THE TERMS OF TRADE

Appropriate aggregations of commodity price data (wholesale prices in the main) are available from the IMF, the UN statistical office and the Economist. Trends in these indices since 1970 are shown in Graph 2.

The IMF calculates a quarterly index in \$US terms for 34 commodities and 40 price quotations (Chu & Morrison, 1986). The weights in the index are based on world export shares of the commodities in 1979-81. Separate indices are published for food, beverages and tobacco, agricultural raw materials and metals. Econometric analysis, referred to below, covers the total index and the four sub-groups. Most of this paper is based on analysis of the IMF data.

The UN publishes a world export primary commodities index, expressed in \$US, and weighted also by world trade shares in the base year (currently 1980). The coverage includes 72 commodities and is available with and without a petroleum component, and grouped into foods, tropical beverages, vegetable oil, agricultural materials, and minerals and metals (UN Monthly Bulletin of Statistics, various).

The Economist provides the most up-to-date statistics on commodity trends. Their data is grouped into foods, non-food agriculturals and metals and is based on 32 commodity quotations. The weights used are based on the value of imports into OECD countries in the base year 1985. Indices are quoted in \$US, sterling and SDR's (Special Drawing Rights) (Economist, March 12, 1988).

It is important to note that the standard aggregation of price quotations requires conversion to \$US terms as an intermediate step. The resulting index thus incorporates changes in both the commodity market in the country sampled and the change in the bilateral exchange rate between that country and the \$US. By using the weighted average of 5 leading currencies in terms of special drawing rights, some of the fluctuation caused by currency differences can be ironed out. In econometric work, an average exchange rate differential between consuming countries and the US ought to pick up some of this variation (see Table 1).

The selection of a deflator for terms of trade comparisons depends on the purpose for which the analysis is made. The United Nations continues to compare primary commodity price changes with prices of exports of manufactures. This reflects the two country twocommodity trade model thought appropriate for development issues in the post-war period. According to the Economist (November 22, 1986) developing country exports will buy only half the volume of imports of manufactures that were possible in 1974 (when the commodity terms of trade reached its post-war high). Since 1980, both commodity prices and manufactured export prices have declined relative to consumer prices and wholesale prices (Graph 3). Accordingly, developing country terms of trade on this basis have declined only marginally in this period (World Economic Survey 1987, p.62) though prices of manufactures have risen steadily in 1986 and 1987 (ABARE, 1988, p.7). In terms of SDR's, prices of exports of manufactures have actually risen since 1980 (World Economic Survey, 1986, p.49).

For econometric work and analysis of New Zealand real commodity price trends it seems more appropriate to use a deflator based on industrial importing countries prices from a demand point of view. The wholesale price index would be most suitable, but the respective CPI or GDP deflators act as good proxies. If the international terms of trade is important, then the index of manufactured exports may still be a good proxy for average New Zealand import prices.

WORLD COMMODITY PRICE TRENDS

According to the ABARE (1988) and IMF (1987), real commodity prices have shown no clear secular trend over the last 100 years (See Graph 1. Figure 3). They point out there have been long periods of declining trends, for example 1870-90, 1926-33, and 1951-70, which have been followed by periods of rising commodity prices. Turning points define "structural" breaks in demand (e.g. wars), technological developments or resource discoveries. They suggest that economic logic would indicate that such movements toward scarcity or abundance would produce a set of reactions that prevent trends from persisting forever. Rising prices encourage production and technological change such as the invention of substitutes and economy in use. Declining prices encourage new uses and supply restraint.

The ABARE ratio is based on the IMF index and earlier series (IMF 1987) deflated by prices of manufactured exports and thus tends to reflect the new world-old world nexus in the development literature. The argument for a secular decline in commodity terms of trade on this basis is summarised in Meier (1964, pp 55-63) and Spraos (1980).

A secular decline since about 1900 is evident in Anderson and Tyyers (1987) data on world prices of Australian food exports (Graph 4). Their index is based on export prices in \$US for cereals, meats, dairy products and sugar deflated by the US producer price index, with price weights based on Australian production in 1977-79. The rate of decline in real food prices over this period is about 0.5% per year (By comparison the ABARE ratio has declined by about 1.5% per year since 1950).

The World Bank (1986) gives data for the period 1950-84 which roughly confirms these latter estimates. The following fitted trends are derived from the ratio of groups of commodity prices to a \$US index of prices of manufactured exports from industrial countries:

Total	Agriculture	-1.03%
	Beverages	-1.13
	Cereals	-1.30
	Fats & Oils	-1.29
	Raw materials	-1.08
	Metals and Minerals	-0.09

In the period 1960-80, commodity prices appeared to rise in unison with world consumer prices and prices in industrial countries as measured by OECD GDP prices (Graph 3).

As might be expected, individual commodities and groups of commodities behaved less consistently than the overall commodity price index. Particularly since 1972, prices have fluctuated more greatly, reflecting much greater supply and demand pressure which built up after the first oil crisis (Graphs 2 and 5). In the period since 1980 prices for all commodity groups have been static or declining, and of course, have fallen sharply in real terms, however that ratio is measured. According to the ABARE, the IMF real indices for food, meatls and agricultural raw materials (deflated my manufactures) have all declined by 25% or more since 1980 (Graph 1, Fig.4). A recovery of prices of raw materials set in from around mid 1986 and in prices of metals from early 1987 (Economist, July 25, 1987).

While the long term series examined by IMF and ABARE reflect no secular trend, the period since the second world war has shown a fairly continuous downward trend of around 1% in the ratio per year. Since 1980 the trend has accelerated. The reasons for the latter seem to be a combination of long-term and short-term factors. On the supply side, technology is continuously and steadily increasing production (especially in some developing countries) and also reducing unit input requirements. On the demand side, high inflation and low growth in industrial countries has reduced short-term demand, while excess stocks and high levels of protectionism have flowed over into international commodity markets (World Economic Survey, 1986, 1987). ABARE believes the world economy is now entering a period of adjustment where supply is more matched to demand, industrial economy inflation is down and industrial production is rising, and world protectionism problems are being addressed. Concerns about the effect of the stock market slump in 1987 on industrial country growth have been allayed in recent reviews (Evening Post, April 16, 1988, Economist, April 2, 1988).

In what follows, commodity price indices are derived from wholesale price quotations in assumed free market situations. It is difficult to disentangle, however, the effect of protectionism on these markets given the high degree of substitution now recognised between products.

COMMON TRENDS IN COMMODITY MARKETS

The variety of factors affecting production, demand and prices in commodity markets have been discussed. One method of searching for common factors is standard econometric analysis of import demand for raw materials in the major industrial countries. Such a study has been carried out in house by the IMF (Chu and Morrison, 1984,1986) and the results bear on the theme of this paper.

The authors set out to examine commodity price changes in the period 1958-84 in terms of income, prices of substitutes, exchange rate differences, stockholding costs and supply shocks (1984). In a second article they elaborate the supply side variables to account for current production pressure and potential export production (the perennial crop problem) (1986). There is no explicit recognition of the effects of protectionism on prices in commodity markets. Estimation is by way of the reduced form in terms of first differences of logarithms. Table 1 sets out the main results for the overall IMF commodity price index and its four sub-groups for the 1984 analysis.

The overall market for the IMF set of commodities is most strongly influenced by the current and lagged measure of economic activity (industrial production in the 7 industrial countries), by the differential in inflation between the 7 countries and the US, and the dummy variable for supply shock for beverages (drought in Brazil). If the inflation differential is broken out into its wholesale price component and exchange rate component, both variables are significant.

Taking the groups of commodities separately, the lagged value of the dependent variable is important for beverages and raw materials, current economic activity is important for raw materials and metals, lagged economic activity is important for food and beverages, the inflation differential works for food, raw materials and metals, stock holding costs affect prices of raw materials and metals, and the dummy variable for beverages remains the same. The food dummy variable (poor production conditions in 1973) is apparently not significant in the food equation.

The 1986 results are summarised in Table 2. In this analysis the demand variables have been reduced to a measure of the inflation

differential, (alternatively: inflation in producing countries and inflation in consuming countries), and industrial production. Supply variables include current production levels and potential production levels. Because of strong multicollinearity, the inflation variables had to be tested in separable equations (indicated by (a) (b) (c)).

In the food and beverage equations current production levels are the most significant price determining factors with industrial activity now only marginally significant. For agricultural raw materials and metals, industrial activity is highly significant and potential production levels influential. Both inflation in producing countries and in consuming countries are statistically significant in the appropriate reduced form.

The dominance of the variable for industrial activity confirms the results shown in Graph 1. The elasticity of commodity prices with respect to industrial production is 2.05, thus confirming the magnifying effect of changes in output in industrial countries. The elasticities in the separate groups are food = 1.26, beverages 1.57, agricultural raw materials = 3.40 and metals = 2.59. Thus prices of metals and agricultural raw materials, which are used heavily as industrial inputs are more sensitive to cyclical fluctuations in industrial production than are the prices of food and beverages (Goldsbrough and Zaidi, 1986).

Comparing the post 1980 decline of commodity prices with that of 1975, Chu and Morrison (1984) state that exchange rate movements had increased their influence while the change in industrial activity was somewhat less. Interest rates had more influence in 1981 and 1982 than in 1975. "The sharp decline in commodity prices in 1981 and 1982 is shown to be a culmination of a trend towards more unstable prices that began in 1970's. The long-term downward trend in real commodity prices from 1972 to 1982 has been more than twice the trend from 1957 to 1971. In addition, primary commodity prices during 1972-82 were more than three times as unstable as they were in 1957-71, while fluctuations in world economic activity, inflation, exchange rates, and interest rates were significantly more pronounced in 1972-82 than in 1957-71".

These analyses confirm that recent problems in commodity markets can be ascribed mainly to relatively low rates of growth in economic activity in the industrial countries, a reduction in the intensity of use of commodities, and also the presence of abundant supplies (IMF 1987). The analyses also confirm that aggregation of prices of commodities obviously obscures the individual variation in the component commodities and that disaggregation into like groups increases the range of variables which are likely to influence individual markets. Logically, the next step would be to analyse each commodity component of the series in turn.

This brings the discussion back to the point that conventional outlook reporting, such as that carried out by ABARE or the NZMAF, ought to and usually does contain a review of general market trends and reviews of individual commodity demand and supply.

NZ PRODUCTS IN COMMODITY MARKETS

A second reason for carrying out research into individual products is that New Zealand is not well represented in the commodity price indices so far discussed. In the IMF set only beef, lamb, wool and hides have any relevance to New Zealand. Furthermore these have relatively low weights in the sub-indices for food and raw materials. On an import substitution basis, wheat prices are included in the food group. In the Economist set wool, hides and timber are represented in the non-food agriculturals and beef, lamb and wheat in the food index. In neither index are found any dairy products.

Thirdly, it must be remembered that these commodity indices are expressed in \$US terms hence some of the original information on market behaviour is lost. By and large, wholesale market prices for beef, lamb, wool and butter have all followed general price trends in the period from 1960 to 1980 (Graph 6) and have declined since 1980 in sympathy with other commodities. Even so wool, lamb and butter prices have increased in nominal terms since 1980, though beef has not.

A fourth point is, of course, that wholesale price quotations only represent one market for each product and this may not represent all the markets that the commodity is destined for. In addition, some markets, as in the case of lamb and butter, are heavily influenced by the operations of price support arrangements for domestic producers in those same markets.

Some indication of relative demand at the wholesale level for New Zealand products can be gained by examination of domestic real prices in each market. In the US, beef prices rose faster than consumer prices in the period 1960-80 (6.9% v 5.31%) but have since declined sharply in terms of consumer prices. In the UK, lamb, wool and butter prices increased slightly less fast than consumer prices over the whole period 1960-1985 (lamb, 7.4%; wool 5.2%; butter 7.2%; CPI 8.6%).

In world market terms, consumer prices expressed in \$US rose by 7.8% in the period 1960-1985 and by 7.4% per year in the period 1960-80. Over the same period the wholesale prices of New Zealand products expressed in \$US rose as follows:

	1960-1980	1960-1985
Beef	6.9	4.3
Lamb	7.6	4.2
Wool	4.0	1.7
Butter	7.0	4.0

Thus the prices of the New Zealand set of commodities have not increased as fast as general consumer prices over the last 25 years, though as observed earlier general commodity prices did rise fairly steadily in the 1960's and 1970's in unison with world consumer and wholesale prices (Graph 3). From the point of view of econometric demand analysis for each product the appropriate deflator could well be the domestic wholesale price index rather than the consumer price index.

THE REAL RETURN TO NEW ZEALAND EXPORTS

To overcome the problem of relying on price trends in single markets, an alternative approach to measuring real export prices is to convert f.o.b. unit values for the main commodities in \$NZ into \$US equivalents or some average "world" price based on the trade weighted exchange rate index. The \$US methodology has been used by Lattimore (at this society) (1986), and the trade weighted index has been used by the Reserve Bank (1981). The latter calls the world price defined above, the "foreign" price. This concept is also implicit in recent NZIER publications where the "world" price component of export prices in \$NZ is separately identified from changes in the exchange rate (Quarterly Predictions, March, 1988, p.24).

As previously there can be some debate on the choice of a suitable deflator. Unit real world prices for all exports, beef, lamb, wool, butter and cheese for the period 1960-1986 are shown in Graph 7. The world index in this case is defined as :

Unit export return (\$N Z)x weighted foreign exchange index world consumer price index (\$US)

Lattimore's work, which yields similar results, is based on the following ratio:

Unit export return (\$NZ) x \$US per \$NZ OECD GDP price index (\$US)

A variant of this methodology is used by the NZ Meat and Wool Board's Economic Service which utilises a lamb, trade weighted index for ascertaining trends in the foreign or world price of lamb (NZMWBES, Paper No T111, 1988).

It is important to remember that the point of measurement of the price exchange in this approach has moved from wholesale market to f.o.b. valuation by the exporter. Importantly, changes in freight and insurance are ignored, especially since these are usually valued in foreign currency terms and are themselves subject to exchange rate variations. Secondly, all exports of a particular product are now represented but not any particular market (which cannot be identified by this method). Thirdly, the process of reverse exchange rate conversion probably introduces further errors of measurement in as much as no particular commodity destination mix is likely to be fully represented in the Reserve Bank trade weighted exchange index. The NZMWBES procedure does compensate for this latter problem.

In the period from 1960 to 1986, the real price of New Zealand exports determined by this method has shown a serious decline. On average the real pastoral export price index has declined by 3% per year since 1960, and the individual products have declined in the range 1-4% per year by whichever method they are measured (Graph 7). Annual percentage changes in the Lattimore index and the Johnson Index for export products at the f.o.b. price level are as follows:

	Lattimore	Johnson		
Pastoral exports	-	-3.1		
Wool	-3.2	-3.6		
Beef	-0.7	-2.6		
Lamb	-1.0	-1.6		
Butter	-2.7	-4.1		
Cheese	-	-2.8		

(For beef, Johnson internationalises with the \$US exchange rate)

The reason for the consistently lower figure using the Lattimore formula relates to the lower rate of increase in recent years of the OECD GDP price index as compared with the IMF index of consumer prices (see Graph 3). In addition the recent deterioration of the \$US has raised the value of export product as compared with the trade weighted index.

DISCUSSION

The measures of international competitiveness of primary products discussed in this paper do not appear to have direct relevance to New Zealand. International price indices represent different groups of products from those New Zealand produces. Wholesale price quotations are only a guide to the market they represent. Equivalent "world" values of f.o.b. prices are very approximate, due to exchange rate conversions and the averaging of different markets.

The best group measures appear to be the food and raw materials sub-groups of the IMF commodities price index (Graph 5). This is fairly obvious as the two subgroups are the only ones in which New Zealand products are represented. The departure of New Zealand pastoral prices from the general IMF trend in 1981-1982 (in Graph 5) appears to be related to better prices for dairy products in those years. Dairy products are not represented in the IMF index.

Econometric evidence suggests the average prices of food commodities and raw material commodities are most closely linked to current and lagged levels of economic acitivity, price and exchange rate differentials between countries, and the cost of holding stocks (in the case of raw materials). Food prices can be influenced by changes in delivery of current production. It may be worthwhile therefore to pursue econometric studies of individual markets for New Zealand commodities, or even groups of markets for single products. The alternative appears to be to continue to pursue descriptive studies of commodities by markets (MAF, 1988). Certainly, commodity marketing boards will only need to focus on groups of markets relevant to their commodity.

A comparison of real export prices measured at the wholesale level and the f.o.b. level reveals that the downward trend in real prices since 1980 has generally been greater at the f.o.b. level. One reason for this could be the greater share of the final dollar taken in freight and insurance over the years (MAF, 1988, p.84). With freight rates denominated in sterling and US dollars, the regular depreciation of the New Zealand dollar since 1974 is one factor explaining this increasing share of freight costs (Graph 8). This factor has been more significant for the United States trade than the United Kingdom trade. The whole methodology for deriving real export prices is very rough, and needs more detailed research.

The ABARE-IMF evidence on the long term trends in real primary product prices suggests a very long-term stable equilibrium but marked medium and short term deviations from the over-all stable trend. Since the second world war the trend has generally been downwards at annual rates of change of about 1-1.5% per year. For the New Zealand group of commodities the trend over this period has been around 2% per year. In this period there has been one major recovery of commodity prices in the early 1970's, but a fairly steady decline since. The decline in real prices has accelerated since 1980. Recent evidence suggest a marked recovery in metal and raw material prices but not in the food group (Economist, March 12, 1988).

These latter trends suggest that commodity prices are now recoupled up with industrial activity. Certainly the lowering of the input content of raw materials was a long term trend rather than a sudden imposition in 1980. The important factors since 1980 appear to be deflationary policies in industrial economies, greater protectionism, supply lags from the 1970's, greater self-sufficiency in some importing countries and surplus disposal. The impact of the stock exchange crash has not been as great as at first thought.

In summary, the analysis of commodity markets reveals general trends in the level of demand in industrial country markets, but different groups of commodities show differing behaviour, and individual commodities show further identifiable differences from the sub-groups. As suggested above, the generalisations drawn from analyses of commodity markets are fairly limited in providing outlook information on individual commodities, and suggests continued emphasis on individual commodity supply and demand relationships.

Dependent Variable		Lagged Price	Economic Current	Activity Lagged	Inflation WPI	Differential ER	Stock Holding Cost	Supply Shock
All Prices	(2)		**	**	**			*
AII TILES	(a) (b)		**	*	**	**		*
Food Prices	(a)			*	**			
	(b)			*	**	*		
Beverage Prices	(a) (b)	*		*				*
Raw Material								
Prices	(a)	**	**		**		*	
	(b)	**	**			**	*	
Metal Prices	(a)		**		**		*	
	(b)		**		* *	**	*	

Table 1. Significant Variables in IMF Commodity Model (1984) (Data : 1958 - 1982)

(a) Net inflation exchange rate effect

(b) Separable inflation and exchange rate effects

* * Coefficient significant at 1% level

* Coefficient significant at 5% level

Table 2. Significant Variables in IMF Commodity Model (1986)

(Data : 1962 - 1982)

Dependant Variable		Inflation Differential (Producers-Consumers)	Inflation Producing Countries	Inflation Consuming Countries	Current Production	Potential Production	Econor Activi	nic Lty
Food Prices	(a)			**			* (borderline)	
Beverage Prices	(a)				**		*	88
Raw Mat erial Prices	(a) (b) (c)		**	*		*	* *	
Metal Prices	(a) (b) (c)		**	*			**	

(a) Testing of Inflation Differential (NS).

(b) (c) Separable regressions due to multicollinearity of variables representing inflation in producing countries and inflation in consuming countries.

****** Coefficient significant at 1% level

* Coefficient significant at 5% level

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4. REAL INTERNATIONAL FOOD PRICES FOR AUSTRALIAN EXPORTS 1900 TO 1985(a) (1977-79 = 100)



- (a) An index of export prices in US dollars for cereals, meats, dairy products and sugar, deflated by the US producer price index, with weights based on the importance of each commodity in Australian production in 1977-79
- Source: Compiled by the authors using price series from the World Bank's Economic Analysis and Projections Department





6. WHOLESALE OVERSEAS PRICE QUOTATIONS : NEW ZEALAND PRODUCTS 1960-85





KIWIFRUIT - A CASE FOR THE INTERNATIONAL

CO-ORDINATION OF MARKETING STRATEGIES

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SUMMARY

The central question in this paper is whether the existence of the International Kiwifruit Organisation (IKO) alone is a sufficient basis to make generalisations which are relevant beyond the immediate scope of the kiwifruit industry. The answer has to be discussed on two different levels.

On a theoretic level it was found that the IKO in its present structure does not fit well into textbook categories, hence a new term had to be introduced, namely "marketing agreements". On the empiric level one might be tempted to establish prerequisites for a marketing agreement out of the history of kiwifruit trade - the respective conclusions though need to be backed up by more research.

Key Words: International Marketing, Food Marketing, Marketing Agreements, Kiwifruit Industry.

INTRODUCTION

It cannot be said that empirical cases regarding the international co-ordination of marketing strategies have yet received adequate coverage in academic literature. As far as kiwifruit is concerned, there are now four reports dealing with international aspects of this particular market. These are:

- New Zealand Kiwifruit Authority (NZKA): Report on Kiwifruit Marketing. Coopers & Lybrand Associates, May 1988 (quoted here as: "Coopers & Lybrand").
- Direction des Produits Agro-Alimentaires (DPA): Le Marche du Kiwi (the market of kiwifruit). Dossiers de la DPA serie "produits-pays", CFCE, Paris, April 1988 (quoted here as: "DPA produits-pays").
- International Kiwifruit Organisation (IKO): Record of Proceedings of IKO Conference, September 8-11, 1987. Biarritz (quoted here as: "IKO Proceedings").
- My own study: Negendank, O. The International Market of Kiwifruit, University of Otago, Dunedin, 1987 (quoted here as: "own study").

None of these reports is published, a fact which I have to mention in the beginning, because without the use of background information drawn from the abovementioned reports, it would not have been possible to compile this discussion paper.

The major thrust of this paper is not so much, however, discuss specific details of the marketing to of kiwifruit; I rather want to attempt the question of or not the example of the IKO whether leads to generalisations in a sense that makes it possible to recommend specific forms of co-operation under specific circumstances.

ANALYTICAL BACKGROUND

Scope and Limitations

Definition of the term "international co-ordination of marketing strategies" is still subject to considerable confusion and this does not apply only to outsiders, who have probably little to do with the strategies involved. Difficulties arise in particular from two major areas:

Firstly, there are not many rules governing the shape or form in which the international co-ordination of strategies takes place. The only thing to be said is that compulsory membership is not enforceable in the international arena, so that statutory arrangements do not fall into this category. Another issue is that national governments may choose to impose legislation which is suitable to sue domestic companies for entering into collusive arrangements. A case in point is the USA (Terpstra, 1983). Apart from this, the only limitations appear to be drawn by the scope of human imagination, and - probably - by economic commonsense.

This of course leads to a myriad of theoretic options, and I do not seriously believe that we do them justice by establishing one common goal for all of them.

Secondly, international co-ordination of strategies, in its most general sense, results in the purpose to establish one or more common strategies of such nature that it could not have been pursued by each participant This principle alone pushes the whole individually. into close neighbourhood with collusions. approach organisations being involved or Persons In such activities are quite understandably, keen to maintain a low profile with the result that published, or even publishable information about them is hard to come by.

In an attempt to keep this paper within reasonable limits, I shall henceforth confine myself to the following premises:

- a) The co-ordination of strategies leads to an agreement which does not require direct capital investments nor does it lead to subordinate relationships. (As opposed to acquisitions, mergers, or joint ventures).
- b) Participants of such agreements may be trading companies, marketing authorities, boards, or state owned enterprises, under the provision that they control a significant percentage of the exports of an agricultural commodity or foodstuff of a given country.
- c) The agreement must be feasible from an administrative point of view. This precludes theoretical constructions which require excessive staffing either because of the need for extensive supervision, or because of a multitude of unrelated objectives and goals.
- d) The agreement is commercial in character, which means that major goals can be expressed in financial terms, and that political, religious, or cultural considerations do not play a dominant role.

The commercial character has some further implications which already show the circumstances under which such agreements may be taken into consideration: the most commonly used financial goal is an increase in revenue which is basically to be achieved by pursuing one of the following avenues.

- Increased sales volume. This is only a realistic a) objective in situations where there are still undiscovered markets (in terms of a country, a region, or some specific consumer group), or to say it in marketing terms: when there is still latent or incipient demand. Such case would also imply that any company or marketing organisation who is first to uncover this latent demand will gain considerable competitive advantages. From a purely strategic point of view it appears illogical that a company or organisation who still belleves in hidden opportunities will join an agreement which almost inevitably requires to share some information.
- b) Reduction of costs. There may be а few circumstances where an agreement (or the respective organisers of it) is in a position to handle specific management functions in a more costefficient manner. Such circumstances however, are normally obvious, and that is why the costnot argument taken on its own is unlikely to constitute a sufficient reason for potential participants to enter into an agreement.
- c) Increased prices. From a marketing point of view, increased prices must be seen as a premium for above average performance in terms of high quality or customer services. Companies who actually have this potential, are unlikely candidates for joining an agreement. The only other option for a measurable increase in prices would be a cartel with very strict rules. Opportunities and limitations regarding the latter will be discussed in sequence.

A final option would be the use of any form of agreement as an emergency measure to stem a general erosion of prices. As to be shown later, this is in the only task which can actually be performed by an international agreement. This case has not been included in the abovementioned points, because it does not necessarily imply the enhancement of revenues. It is a more sensible question to ask: how much worse would the situation have been without the existence of an agreement?

The latter case is - unfortunately - not uncommon in agricultural marketing. This is due to the limited flexibility in agricultural supply. Thus for instance it takes about 8-9 years for a kiwifruit vine to reach full bearing, and after that it will crop prolifically for many more years (Sale, 1983). One may well imagine that the worldwide 517,000 hectares which are currently planted with kiwifruit (IKO Proceedings) will continue to produce fruit during the next few decades - irrespective of whether there is demand for them or not.

Cartels

Cartels are outstanding insofar as they are the only way measurable impacts achieve on prices through t.o co-operation; a statement which does International not deny of course that other forms of marketing agreements may have an impact on prices too, albeit not necessarily in a manner which is suitable for measurement. Cartels are also conspicuous by the negative publicity they use to generate. A third question is their practicality.

Legislation and the free rider problem are the most frequently quoted reasons why cartels are not supposed to work. This is only a partial answer. Legislation applies only in a few cases because most governments are careful to assess the potential gain in export revenues against the potential harm it does to their domestic Such assessment does not always need to be to markets. by the disadvantage of a cartel, as shown the Organisation of Petroleum Exporting Countries (OPEC). As far as free riders are concerned, there are effective to prevent them from reaping the benefits. means are: restricted access to Examples technical and marketing know how, restricted access to certain channels (i.e. supermarket chains), use of a common trademark or logo, etc. Especially in markets where product quality notoriously heterogeneous as in the case of 15 agricultural produce, this may well result in a situation where non-members do not actually achieve prices as obtained by the cartel. Osborne (1976), who analysed this, plus a few more related questions, comes eventually to the conclusion that: "A cartel of raw material producers is well placed with respect to the non-member Its chief difficulty is the detection of problem. cheating, a problem that public policy should exacerbate possible and avoid solving in any case." if. From an administrative point of view, the severity of this problem is related to the type of agreement, the cartel is based on.

Price Agreements:

These cartels agree on one or several prices, depending on the grading systems used, and members are supposed to do their transaction at the jointly determined level of Temptations to undermine the agreement arise prices. differences in cost structures - a most likely from due to the heterogeneity of constellation growing various parts of the world. conditions in Control problems are formidable. The case of food manufactures in France, albeit not in a cartel, shall be used to illustrate this issue. The author (Yon, 1983) feels it necessary to distinguish between a so-called "marge avant" (manufacturer's open discount) and a "marge arriere" (manufacturer's concealed discount). The open discount consists of up to seven items, deduction of which leads to the so-called "basic price" (as opposed to the official selling price). "This basic price is not however, the price actually paid by the distributor, as he also receives further rebates which are not shown on the invoice and are paid at the end of the year or at the end of the quarter" (ibid). There is no reason to assume that individual cartel members are unable to use similar practices if they feel that it works to their advantage.

Quantity Agreements:

Taken by its most primitive meaning, such agreement would imply limiting the amount of primary produce. This must be dismissed as highly unlikely because its implementation would require the assistance of national authorities, for example agricultural advisory services.

More subtle options are restrictions on the flow of products in a way that each individual member confines itself to market its products either only within one or several specified territory(ies), or through particular channels (i.e. specified supermarket chains), or only during specified month(s) of the year (in case of seasonal products). This approach too would require supervisory staff on part of the cartel-organisation, yet controls are made easier because of one or several of the following reasons:

- a) There is some trend that supermarkets concentrate on a small number of strong suppliers, reducing the number of brands within a given product category to one or two.1) If this goes down to one brand only, then it would have an effect similar to the deliberate decision of suppliers to allocate channels among them.
- b) Concentration among supermarkets implies that transactions have to be done in bigger lots, which are easier to control.
- c) Branding in itself makes it easier to identify the product delivered by one particular supplier.

This is an observation made by D Huffman, Managing Director of Griffin & Sons (c.f. Retail News, June 1986, p.19)

- d) The accuracy of national and international statistics is increasing, which matters in a case where cartel members want to allocate entire markets amongst each other.
- e) Seasonal products will constitute a special case in which time schedules or so-called "calendarregulations" come on top of all other considerations.

A major weakness of this approach is that it does not allow for the allocation of exact quotas, since the allotment of a particular supermarket chain, or a particular month of the year is not yet a sufficient reason to assure some predetermined level of sales.

Marketing Agreements

This term is only used infrequently in literature and hence its definition is not yet free of ambiguities. Terpstra (1983), mentions that a US company that makes some overseas marketing agreement with another firm, may be affected by antitrust laws.

however, calls it a term of US marketing Hoos (1979) legislation which is used to describe voluntary, contractual arrangements between the secretary . of and handlers of a particular agricultural agriculture commodity. Because these two examples show some inconsistencies, I shall feel free to use my own definition.

In this paper the term "marketing agreement" shall be used for all arrangements which fall under the initially established premises without matching the criteria of a cartel. A commercial goal exists in these cases as well yet it is pursued by means other than the determination of quantities or prices. A marketing agreement might then for instance adopt one or both of the following functions:

To act as an information pool, or as a clearing a) house. This refers to the truth that any company or marketing organisation has a need for information and that much of this information is gathering "generic" in a sense that it is required by most, if not all, businesses within a given industry. Examples are basic data about supply, demand and prices. If this data is gathered centrally, say by the organisers of a marketing agreement, then it redundant work and duplications. reduces The has to be expressed in terms of benefit cost efficiency. The concept of a clearing house goes one step further by using this information also with the purpose of arranging deals among members. The

latter though applies only under very specific circumstances.

b) To co-ordinate advertising campaigns launched by individual members. This may imply for instance that individual members advertise their product exclusively (i.e. without facing competition from their fellow members) throughout a specific period of time, or within a specific territory. This matters in particular, when "clutter" is perceived Thus: "... as informationa real threat. as processing mechanisms, we humans are severely limited." (Ray, 1986). It has to be borne in mind that this limitation applies irrespective of the nature or content of the advertising message, with the implication that any manufacturer/supplier who does advertising is in fact competing for consumer's attention. Thus it may occur that the concurrent advertising of several suppliers - each with a comparatively small budget - is inclined to increase the impression of clutter rather than having any significant impact on the market. When this is established to be the case - and only then - the coordination of advertising strategies would result in a more effective use of the given budgets. Here again the true benefit must be seen in the way of cost-efficiency rather than in a measurable impact on prices.

The activities of a marketing agreement do not need to be confined to these two areas. Due to its voluntary membership, and the given premise that members have to be major suppliers of agricultural produce, it comes close to the concept of voluntary producer associations as outlined by Zwart and Martin (1987). Here the authors outline five major sources of financial benefits:

- a) Information Transfer.
- b) Economies of Size.
- c) Joint Promotional Activity.
- d) Research and Product Development.
- e) Provision of Marketing Facilities to Aid Exchange.

There can be little doubt that it is possible to organise international marketing agreements in a manner which is utilising all five of these sources for the prosperity of its members. In this case it is vital however, to draw a clear line between the real, and the perceived benefits of such agreement. For the perceived benefits it İs sufficient that all members see a necessity per se in out certain activity, instance carrying а for advertising. The real benefits though are more likely to result from more efficient ways to manage these activities - activities which might have been pursued as well if the agreement did not exist.

THE INTERNATIONAL MARKET OF KIWIFRUIT

The International Kiwifruit Organisation (IKO)

Unless otherwise quoted the following passage is entirly based on the IKO Proceedings, full details of which were given in the introduction.

Current members are Australia, Chile, France, Italy, New Zealand and the USA (represented through California). Japan is going to become the seventh member in 1988 (DPA produits-pays). Present IKO members control 88.6% of the world kiwifruit production in 1987, and 87.8% of the estimated world production in 1990. Including Japan, this share will rise to 96.8% in 1990.

The purposes of the IKO are:

- a) To provide for kiwifruit producing nations a consultative forum for better mutual understanding.
- b) To foster the common goal of worldwide acceptance of kiwifruit.
- c) To provide the opportunity for a united voice.
- d) To encourage exchange of production and marketing information.
- e) To assist in every way possible the continued success of the international kiwifruit industry.

As far as it could be established by myself the actual activities of the IKO seem to evolve around the two functions of "information transfer" and "co-ordinated advertising". In this context it is probably worth mentioning that : "International production and trade in kiwifruit is too small by global standards to warrant separate analysis by international food and trade agencies" (Woods et al., 1984). In this case the IKO appears to be the most suitable organisation to fill this gap.

In regard to advertising it would be premature to make any assessment. According to industry sources, the real benefit of the present campaigns will be only felt in as late as 1992. Given the fact that IKO members started only recently to set up budgets which can remotely be seen as significant in the way of international marketing, I feel inclined to agree with the mentioned statement.

Administration of the IKO follows a rotatory system, according to which each member country gets a one year

turn to chair the organisation. The chairing country appoints representatives from its national organisation to serve as IKO chairperson and secretariat. The major forum for co-ordination of strategies is an annual conference. At present the IKO is being chaired by New Zealand. Chile is supposed to take over after the 1988 conference.

This brief outline should suffice to demonstrate that the IKO falls under the category of "marketing agreements" according to the definition in this paper. Administration is designed with the purpose to keep costs at a minimum. The present form of administration almost precludes any supervisory function. It is necessary to mention this because a cartel for instance could not exist in the long run without any form of direct supervision. In a marketing agreement though, the supervisory function must be seen as optional at best.

Global Supply and Demand of Kiwifruit

This is not a comprehensive analysis of the world market situation for kiwifruit – a task that was much better provided in the initially mentioned reports. This passage serves only as a background for the subsequent discussion of prices. That is also why I am still using charts from my own study (see introduction) for the purpose of illustration.

Chart 1 shows the increase of world production in almost the shape of an exponential curve. This must not be a surprise since it became clear that the initial success of New Zealand grown kiwifruit was inclined to create strong bandwagon-effects. Unfortunately this is not uncommon in agriculture.

Chart 2 shows the growth of exports in a similar shape but at reduced absolute levels. This is explained by the fact that major producers after New Zealand, i.e. the USA, France, Italy and Japan, are substantial markets in their own right. Comparison between charts 1 and 2 for instance suggests that during the current year (1988) only two thirds of the kiwifruit harvested worldwide will eventually enter the international trade.

Chart 3, i.e. imports of kiwifruit, must be called a sales target rather than an accurate forecast. This chart assumes that traditional markets in Europe, North America and Japan will continue to absorb the full amount of kiwifruit exports. If this assumption fails, more attention should be addressed to new markets, such as Singapore, Bahrain and others not included in the chart.

As indicated in the beginning, there is now more than one estimate available regarding the global development of







Chart 2 : Kiwifruit Exports By Countries 1975-1990

Sources: see par. 2.1 Assumption: constant growth between 1984 (latest data) and 1990 (forecast)


Chart 3: Kiwifruit Imports By Countries 1975-1990

Sources: see par. 2.1 – Assumptions: see par. 2.3 *Japan, F.R.G., USA, Austria, France, Australia, Belgium when taking less than 1,250 mt each **Canada, Denmark, Finland, Holland, Italy, Norway, Spain, Sweden, Switzerland, UK

demand and supply. Due to the limitations in space, а single example should suffice to draw some comparisons. Thus, for instance, chart 2 relied on the assumption that worldwide kiwifruit exports would be 153,000 tonnes in 1986 (own study). According to the IKO Proceedings. during this time were 128,000 tonnes, exports or 16% less, whereas DPA produits-pays shows a figure in the middle, i.e. 138,000 tonnes. For the following year I estimated world production at 285,000 tonnes (1987), (own study), whereas the IKO came up with a figure of 367,000 tonnes (IKO Proceedings).

Without going further into details, it should be clear that more than one factor could be used to explain such statistical discrepancies, and it would be an interesting task in future to develop means and ways of how to improve the accuracy of international statistics on kiwifruit.

Impact on Prices

It is difficult to imagine that a development as presented in chart 1 has no bearing on the long term development of kiwifruit prices. Early warnings were to be heard already four years ago, when the German ZMP (Zentrale Markt-und Preisberichtstelle/Central authority to monitor markets and prices) predicted that retail prices would have to be halved from then DM 11.- per kg to DM 5.- or DM 4. - per kg in order to place the expected amounts in the market.2) It is true that retail prices in the F.R. of Germany plummeted from about DM 1.50 each in the late 1970's to as low as DM -.39 each in 1987 (own study).

The trend in wholesale, c.i.f. landing, or even producer prices was far less dramatic. Thus the average return received by New Zealand growers was - in deflated prices - 10.22 \$ per tray in 1973, reaching a peak of 12.96 \$/tray in 1978, and declined only to 7.78 \$/tray in 1983 (Woods et al., 1984). According to the NZKA (quoted by Coopers & Lybrand), the index of real farm gate returns which was set at 100 in 1981, fell to 73 in 1983, reached after some fluctations, about the same level again in 1986, and only in 1987 it was as low as 38. One might argue though that 1987 was exceptional in more than one aspect.

2) ZMP Der Markt - Obst und Gemuese - 4/1984, p.231

An obvious explanation for the discrepancy in trends between retail and producer prices lies with the fact that excessive retail margins, which undoubtedly existed in the late 1970's, could be subsequently reduced hence serving as a buffer (own study).3) The trouble now is that little of a buffer is left in the present margins and in case of any further reduction of consumer prices, the full brunt of such action would have to be borne by growers.

One way to disconnect New Zealand prices from the general development in the world market, would be product differentiation. Thus Coopers & Lybrand recommend under paragraph 8.5 to focus to a much greater extend on: "differentiating New Zealand kiwifruit from kiwifruit supplied from other countries (by placing emphasis at the trade level on brand promotion, quality and service)." It would be more than interesting to investigate the question of whether this approach results in any measurable differential between New Zealand and non-New Zealand produced kiwifruit.

CONCLUSIONS

The question asked at the beginning of this paper was whether the existence of the IKO leads to any form of generalisation which could be relevant beyond the immediate level of the kiwifruit industry. The answer needs to be discussed on two different levels:

On an abstract level it was found that the present state of the IKO does not fit well into established categories, so that a new category had to be introduced, i.e. "marketing agreements". I felt this necessary because an international organisation controlling some 90% of world harvests of a specific product may superficially appear like a cartel. There are differences though which I call fundamental. Thus:

- Measures undertaken by a cartel will inevitably create the impression that it has some influence on the development of prices, and its success or failure will be assessed accordingly. In case of a marketing agreement it would be very unwise to claim any measurable impact on prices - benefits should rather be expressed in terms of rational management or cost efficiency.

³⁾ This would be even more obvious if the analysis was extended to include wholesale and c.i.f. - landing prices.

- The functioning of a cartel requires inevitably direct supervision, and staffing requirements are correspondingly high. In a marketing agreement, direct supervision is only of secondary importance, and staff can be kept at a minimum.

On a more specific level, it seems obvious that the sense (or nonsense) of a marketing agreement depends on a number of prerequisites. The example of the IKO suggests that such agreement may be taken into consideration when:

- A vast majority of world suppliers of a given product perceives a strong necessity to join forces in areas such as market intelligence, or promotion.
- Decline of prices is perceived as a real threat.
- Product differentiation does not provide a feasible alternative.

It should be stated though in due caution that the provision of just one case is not yet enough to identify prerequisites for the establishment of marketing agreements. The last mentioned three statements should rather be seen as theses to serve as a background for discussion now, and as a subject of further investigation in future.

Thank you for your attention.

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IS THE RECENT SHARP DROP IN FERTILISER USAGE A MAJOR CONCERN FOR PASTORAL PRODUCTION?

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SUMMARY

The recent drastic deterioration in the farmgate terms of trade in the pastoral sector has caused a sharp drop in demand for phosphate fertiliser, from 2 million tonnes in 1984/85 to just over 1 million tonnes in 1986/87. This drop in fertiliser usage has in turn generated concerns about possible loss in pastoral production base among politicians and farming related groups. Based on the observed not-soclear relationship between fertiliser usage and pastoral production from historical aggregate, on-farm and experimental data, however, this paper argues that the recent sharp drop in fertiliser usage should not be a major concern for pastoral production. The centre of the argument lies on the fact that phosphate fertiliser is a form of capital input which is not required to be applied annually. Using an economic fertiliser model the paper shows that farmers' decision to cut down or withhold fertiliser is rational and may well be optimal. The long term effects on fertiliser demand and pastoral production of a sudden drop in the farmgate terms of trade is also examined.

Keywords: phosphate fertiliser, carry-over, capital input

INTRODUCTION

The combined effects of the removal of supplementary minimum prices and fertiliser subsidies and the falling trend in returns in international commodity markets and rise in the value of the New Zealand dollar caused the recent drop in fertiliser demand. The period from 1984/85 to 1986/87 saw a nearly 50% drop in the sale of fertiliser, from 2 million tonnes to just over 1 million tonnes (MAF 1988). This has been concerning politicians and farming related groups. How this reduction will affect pastoral production and whether this reduction should be a major concern are the two relevant and interrelated questions this paper attempts to address.

Aggregate, on-farm and experimental evidences show neither direct nor clear relationship between <u>fertiliser usage</u> and <u>pastoral production</u>.

¹The views expressed in this paper are those of the author and not necessarily those of the Ministry of Agriculture and Fisheries. This paper then argues that the current sharp drops in fertiliser usage should not be a major concern to pastoral production. The centre of the argument is that phosphorus is a capital input with high carry-over effect and not a current input. Farmers have been in the past applying abundant fertiliser and building up high soil phosphorus reserve. The phosphorus already deposited in soil may be just sufficient to produce the level of stock sustainable in the current economic environment.

The organisation of this paper is as follows. An examination of the historical relationship between aggregate fertiliser usage and pastoral sector performance is first presented, followed by the micro on-farm and experiment evidences analysing the relationship between the two. The concept of phosphorus being a capital input but not a current input and its implication on fertiliser application are then explored. An economic fertiliser model developed by Scobie and St-Pierre (1986) is used to show that farmers' decision to cut down or abandon usage of phosphate fertiliser is rational and may well be optimal despite the concerns of politicians and farming related groups. Finally, the long term effects on fertiliser demand and pastoral production of a sudden drop in farmgate terms of trade is addressed through simulation.

RELATIONSHIP BETWEEN FERTILISER USAGE AND LIVESTOCK PERFORMANCE

<u>Historical Aggregate Relationship</u>

The relationship between fertiliser usage and total pastoral production is not obviously clear; a sharp drop in fertiliser usage from about 2.0 million tonnes in 1984/85 to 1.1 million tonnes in 1985/86 was not followed by a corresponding drop of the same order of magnitude in pastoral production. Total stock of sheep, beef and dairy cattle measured in stock units remained relatively constant, only droppingfrom 104.3 million to 103.6 million stock units during the same period (Figure 1). However, to examine the relationship between livestock performance and fertiliser, it is more appropriate to look the relationship between <u>fertiliser available to pasture</u> (soil phosphorus <u>reserve</u>) and total stock number and not just usage and production (Chiao, 1988), a point which will become clear in the latter part of the paper.

In fact from figure 1 the only apparent relationship between fertiliser usage and total stock is between 1961 and 1966. Since 1970 total stock numbers of sheep, beef and dairy cattle have been relatively constant, at just over 100 million stock units, while fertiliser usage fluctuated widely between 2.5 and 1.1 million tonnes.



On-farm Fertiliser Usage Pattern

The average topdressing pattern of sheep and beef farms could provide an overall picture of the usage of phosphate fertiliser. Phosphate fertiliser is essential to pastoral production in New Zealand, but does not appear to be an input which has to be applied each year. It is evident from the table below that, first, each year, favourable or not, there are always a small but not insignificant number of farmers who skip applying phosphate fertiliser; and, second, those who apply fertiliser may not topdress all operating paddocks. In fact on average less than half of the total effective area is fertilised per year since 1981/82.



fertiliser quantity

Alternatively, farmers can minimise the impact on profitability of the reduction in DMP due to cutting down usage of fertiliser by employing better management, eg raising pasture utilisation, defined as the percentage of DMP being consumed by the stock, from, say, 70% to 80%. This may more than offset the effect of production drop due to nontopdressing and in fact increase the amount of DMP consumed by stock.

The following is a numerical example using the economic fertiliser model developed by Scobie and St-Pierre (1986) to show how a rational sheep farmer would react to the changing output/input price ratio. Other parameters of interest used are residual factor 0.8 and pasture utilisation 70%.

	marginal return	cost of P	optimal P	opening P	applied P	output
	\$/su	\$/kg	kg/ha	kg/ha	kg/ha	su/ha
year 1	L 25	2.5	140	112	28**	16.2
year 2	2 15	3.0	97	112	0**	15.1
year 3	3 15	3.5	88	90	0**	13.7
year 4	1* 15	3.5	N/A	72	0	13.5
<pre>*In year 4 this farmer raises pasture utilisation from 70% to 80% through better management. ** denoting optimal rate of application.</pre>						

Table 2 Phosphate fertiliser application and pastoral production

In this example it is assumed that marginal return per stock unit drops by 40% from year 1 to 2 and the price of fertiliser increases by 20%; marginal return remains unchanged and fertiliser prices increases by one-sixth from year 2 to 3 and no change from year 3 to 4. The optimal decisions for year 2 and 3 are for no application at all. Sheep production drops marginally from 16.2 stock units per hectare in year 1 to 15.1 and 13.7 stock units in years 2 and 3 respectively. In fact the optimal decision would suggest total soil phosphorus level to be 97 kg/ha in year 2 and a production level of 14.4 stock units if the input were of current input form. Because the soil phosphorus reserve is already higher than the optimal level, no application for year 2 is optimal. An identical decision, ie. no fertiliser, applies for year 3. Expecting the soil phosphorus will continue depleting in year 4, the farmer can arrest a further drop in sheep production by raising the pasture utilisation from 70% to 80%. The example shows that the net effect of a suboptimal decision in the 4th year of applying no fertiliser complimented by better management through raising the pasture utilisation from 70% to 80% is a reduction in stocking rate of only 0.2 stock units per hectare.

The changes in relative output/fertiliser price used in this scenario resemble the changes in farmgate terms of trade in the pastoral sector since 1984/85. Thus the results of this hypothetical case can be readily applied to explain the farmers decision to drastically cut down or abandon usage of fertiliser since 1984/85. The indications are that farmers are rational and may well be optimal under the current unfavourable economic environment.

LONG TERM EFFECTS ON FERTILISER DEMAND AND PASTORAL PERFORMANCE OF A SUDDEN DROP IN FARMGATE TERMS OF TRADE

The sharp drop in fertiliser demand was caused by the deteriorating farmgate terms of trade. It has been shown that the short term effect on livestock performance of the sharp reduction in fertiliser demand is less drastic than the drop in fertiliser usage itself. Since phosphate fertiliser is a capital input, the drop in farmgate terms of trade will affect future fertiliser demand and pastoral production as well. This section will address the long term effects on fertiliser demand and pastoral performance of a sudden drop in farmgate terms of trade.

Instead of running simulation based on current and unknown future prices, this section draws on results from the simulation of removal of fertiliser subsidies in Chiao (1988). The similarity between the two scenarios is a "sudden sharp drop in the relative output/fertiliser price". This sudden exogenous shock deviates the relative price away from the trend. In the long run, the relative price will return to its trend (dotted price line in figure 3).



The major results of the simulation can be summarised as the four points below.

I. Demand for fertiliser drops drastically immediately after the shock. II. Demand for fertiliser recovers from the second year, assuming no further deteriorating in the farmgate terms of trade. One can generalise that an improvement in the farmgate terms of trade will induce a sharp increase in fertiliser demand.

III. After 4 or 5 years the demand level matches up and exceeds that without shock and then converges to the trend.

IV. Pastoral production base, or total stock number measured in stock units, drops initially by about 4% and maintains at similar levels for 4 years and gradually recovers to the normal trend level.

CONCLUSION

Based on historical aggregate, on-farm and experimental data this paper has shown that there is neither clear nor direct relationship between fertiliser "usage" and pastoral production on an annual basis. The major reason is because that phosphate fertiliser is a form of capital input with high carry-over effect. With the recent sharp drop in the farmgate terms of trade in the pastoral sector, farmers' decision to cut down or withhold fertiliser is considered rational and may well close to be optimal. This paper also draws the results from a simulation to show that the long term effects on fertiliser demand and pastoral production won't be drastic, providing that there is no further deteriorating in pastoral sector's farmgate terms of trade.

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WHY FARMERS SHOULD WORRY ABOUT THE BUDGET BALANCE

Traditionally, Australia has run an external current account deficit. Relative to GDP the deficit was 4 per cent in the 1950s, 3 per cent in the 1960s and 4 per cent in the 1970s and early 1980s. It rose to 6 per cent in FY86 (July 1985-June 1986) but then fell to 5 per cent in FY87 and an estimated 4 per cent in FY88 (Table 1).

Table 1. <u>Current Account Transactions</u>, FY50-FY88. (as per cent of GDP)

			Trade		Current	
	Exports*	Imports*	Balance*	Transfers	Balance	
FY50-FY59	20	20	0	-4	-4	
FY60-FY69	15	16	-1	-2	-3	
FY70-FY79	15	15	0	-4	-4	
FY80-FY84	16	18	-2	-2	-4	
FY85	16	18	-2	-3	-5	
FY86	16	. 19	-3	-3	-6	
FY87	16	18	-2	-3	-5	
FY88**	17	18	-1	-3	-4	

* Comprises goods and services ** July 1987 through May 1988 Source: Australian Economic Statistics, 1949-50 to 1984-85, Occasional Paper No. 8A, Reserve Bank of Australia. Balance of Payments, Australia, May 1988, No. 5301.0, Australian Bureau of Statistics.

One of the aims of this paper is to suggest that it is neither in the international nor the national interest for Australia to continue running a current account deficit. From the viewpoint of international equity it is not appropriate for a comparatively rich country such as Australia to tap into the flow of savings from the industrial to the developing countries. And from the standpoint of national interest we probably should not be borrowing at very high rates of interest to finance an increased level of consumption.

A second aim is to describe a set of policies that could be used to eliminate the current account deficit. It is argued that budget policy should be aimed at, among other things, ensuring satisfaction of the national account condition for current account balance - i.e., that total income equals total spending. The real interest rate can

256

then move to the level that brings about satisfaction of the capital account condition for current account balance - i.e., that the capital account also be balanced. The real exchange rate will then fall to ensure satisfaction of the trade account condition i.e., that exports equal imports (where both are broadly defined to include services and transfers as well as goods).

A third aim is to examine the effects of the policies on net farm income. It is argued that, while the budgetary changes would impose short term costs on farmers, these would be more than offset by the effects of the associated interest rate and exchange rate changes. On balance, the average farmer could expect to gain about \$10,500 from the package.

1. The Current Account Goal

It is in the interest of the world as a whole, Australia and the Australian farming sector that Australia eliminate its current account deficit. The third section of this paper discusses why farmers would benefit; in the present section we consider some of the reasons why the world and Australian economies could expect to gain.

International equity suggests that the developed countries should make resource transfers to the developing countries in order to narrow the gap between average per capita income levels in the two sets of countries. Ideally, this would be done through transfer In a second-best context, however, it can be payments. done via net capital flows. Although the developed countries would expect to get a positive return on their the developing countries would also investments, normally benefit through higher tax revenues and in the returns to their own factors of increases production.

For the developed countries to lend to the developing countries the former must run surpluses (and the latter deficits) their must run on current account transactions. If Australia is to add to, and cease subtracting from, the net savings that the developed countries make available to the developing countries it must replace its deficit on current account with a surplus. But if a surplus cannot, or will not, be achieved it would still represent substantial progress if current account receipts and payments were to move into balance.

From a national viewpoint the continuation of current account deficits into the 1980s would seem to be justified only if there has been a marked change in the overlife consumption, or intergeneration distribution, preferences of voters. If this were not the case, the change in investment performance of the Australian economy would seem to indicate that we should now be running surpluses. As a comparator period we take the second half of the 1960s.

The years FY65-FY69 came toward the end of a very stable period for the Australian economy. From the middle 1950s growth had been high and fairly uniform and unemployment and inflation had been low. More importantly, they had been quite predictable.

In this environment, Australians had been able to assess and react to the way in which their incomes were being allocated between consumption and saving. And they had thought it appropriate for individuals in their own right, and firms and governments acting on their behalf, to allocate 25 per cent of gross income to saving. Within consumption they allocated less than one dollar in five to goods and services provided by governments (Table 2).

	<u>FY84-FY87</u> . (per cent of GDP)	
	FY65 - FY69	FY84 - FY87
Private Sector		
Income	80	78
Consumption	61	61
Saving	19	17
Investment	20	17
Balance	-1	0

Table 2. Income and Expenditure, FY65-FY69 and

Public Sector Income 20 22 Consumption 14 20 Saving 2 6 7 Investment 9 Balance -5 -3 Total

Income	100	100
Consumption	75	81
Saving	25	19
Investment	29	24
Balance	-4	-5

Source: Data supplied by Australian Bureau of Statistics, and Commonwealth Budget Statements, 1987-88.

In FY65-FY69 the ratios of national saving and national investment to GNP were 25 per cent and 29 per cent, respectively. As a result, the ratio of the current account deficit to GNP was 4 per cent. The real rate of interest during this period was negligible and it was frequently stated that, through its current account deficit, Australia was borrowing at low rates of interest to finance real investment.

By FY84-FY87 the investment to GNP ratio had fallen by 5 percentage points, to 24 per cent. The decline was sufficient to permit a swing in the current account balance from the deficit of 4 per cent of GNP to a surplus of 1 per cent of GNP.

This is not, however, what actually occurred. Rather, the current account deficit ratio increased to 5 per cent of GNP. Compared to FY65-FY69 the deficit was being used entirely to finance consumption. And the component that accounted for the whole of the increase was government consumption.

The change in the use to which the current account deficit was put was associated with a very large increase in real interest rates, to an average of 7 per cent (90 day bill rate). Thus, while one could argue that in the latter half of the 1960s Australia was borrowing at a low rate of interest to finance investment, for the mid 1980s it would be more appropriate to say that it was borrowing at a very high rate of interest to finance government consumption.

The change in behaviour could have reflected a radical change in tastes of Australian voters. We could have increased the value we place on present consumption compared to future consumption and we could have adopted a much more selfish approach toward our heirs. It seems more likely, however, that the large rise in the share of government consumption in GNP was a mistake.

The mistake was in not recognising that the sharp fall in economic growth that occurred in the mid 1970s was a long-term and not a short-term phenomenon. It was an understandable mistake, and one that was shared by policy makers and advisers in most western countries.

In the western industrial countries the growth of potential output, as determined by increases in the work force and technical progress, appears to have averaged about 3 per cent a year over the last century or so. During the first half of that period the actual growth of output was also about 3 per cent, and by the late 1920s actual and potential output may have been roughly equal. During the 1930s and 1940s the work force continued to rise and new ideas continued to be generated by universities and enterprises. However, production changed very little in the 1930s and much of the increase that occurred in the 1940s was to meet the war effort. As a result, by the end of the 1940s the western world faced quite a large shortfall of actual from potential output.

This shortfall permitted western countries, including Australia, to sustain growth of about 5 per cent during the "golden quarter century". The capacity to continue this high rate ceased when actual output hit the more slowly growing potential output ceiling in the mid 1970s.

In the second half of the 1970s the growth of private consumption expenditures slowed down in line with total output and incomes. However, government consumption continued to grow at about the same pace as in the 1960s and early 1970s. By the mid 1980s the growth of government consumption had also slowed down in most western countries. But most western economies, including that of Australia, were left with a much higher ratio of government consumption to private consumption, and of total consumption to GNP, than had prevailed up to the mid 1970s.

2. Policies for Current Account Balance

The current account balance can be looked at in several ways: as the relationship between exports and imports, as the counterpart to net capital flows and as the relationship between income and spending. We will refer to these as the trade account, the capital account and the national account approaches, respectively.

Each of these approaches can be regarded as implying a condition for current account balance. These conditions are:

- * exports = imports (trade account approach)
- * net capital inflow = zero (capital account approach)
- * income = expenditure (national account approach).

Since the approaches represent different ways of viewing the same phenomenon, satisfaction of any one of the three conditions implies satisfaction of the other two conditions. However, in devising a set of policies to achieve current account balance it is useful to pay separate attention to each condition. This helps ensure that there are no inconsistencies in the package and that it can achieve its objective.

a. The Trade Account Condition

The National Farmers' Federation believes that governments should seek to eliminate the current account deficit while maintaining strong growth of output and employment. In the Australian context, economic growth of 4 per cent a year, the actual rate that Australia has achieved over the last four years, should be a constraint on the policies the authorities adopt to bring exports and imports (goods, services and transfers) into balance.

The Federation also believes that firms and industries should compete with each other on what is commonly referred to as a "level playing field". In line with this it argues that the exchange rate, rather than tariffs, subsidies, quotas and the like, should be the intermediate variable through which policy works to give the appropriate signals to exporters and importers.

The University of Melbourne's Institute of Applied Economic and Social Research estimates that a 1 per cent real depreciation of the Australian dollar will reduce the current account deficit by \$1.2 billion. In Australian dollars, most of the improvement comes from a rise in the value of exports; in foreign currencies, of course, a larger part of the improvement is reflected in a fall in the value of imports.

In calendar year 1987 Australia's current account deficit was about \$12 billion. Under the Federation's approach, therefore, real depreciation of 10 per cent would be a necessary condition for equality between exports and imports.

Under the Bretton Woods system of fixed exchange rates, real depreciation could be achieved by reducing the par value of a country's currency. However, under the present system of floating exchange rates, the nominal exchange rate is no longer a policy instrument. It is an intermediate variable. This raises the question: how, under the present system, can the Australian authorities bring about a fall of 10 per cent in the real exchange rate? To answer this question we must move on to the capital account condition.

b. The Capital Account Condition

Under a floating exchange rate system, the exchange rate equates demand and supply in the foreign exchange market. It is the price that clears this market. The exchange rate can also be considered as the price that equates the net supply of (demand for) foreign exchange on capital account with the net demand for (supply of) foreign exchange on current account. If, over the medium term, the net inflow of capital is reduced to zero the exchange rate will fall until the net demand for funds from the current account is also brought back to zero. The question thus becomes : how can the authorities reduce net capital inflow to zero?

Many factors influence net capital inflow : historical relationships, political stability and the like. Some of these cannot easily be affected by the authorities. There is, however, one factor that can be influenced by policy. That factor is the real rate of interest.

Net capital inflow tends to be quite responsive to a country's real interest rate differential - i.e., to the difference between the country's inflation-adjusted interest rate and the average of the inflation-adjusted interest rates of other countries. Preliminary work by the Federation suggests that, for Australia, the relationship can be approximated by

NKI = 3 + 3 [r - p] - [r - p]

- where NKI is net capital inflow in billions of dollars, r is the nominal rate of interest on 90 day bank bills,
 - p is the rate of inflation,
 - A is Australia and
 - W is the major capital lending countries.

Currently, the real rate of interest is about 6 per cent in Australia and 3 per cent in the major capital lending countries. The real interest rate differential is thus 3 per cent, which is consistent with the present level of net capital inflow, of about \$12 billion.

If the relationship above is correct, and if it continued to hold, reducing net capital inflow to zero would require that the interest rate differential fall to minus 1 per cent. Assuming that the real rate abroad remained at 3 per cent, this would require a fall in the real rate in Australia to 2 per cent.

On the basis of these numbers a fall in the real rate of interest to 2 per cent would eliminate net capital inflow. The latter in turn, would reduce the real exchange rate by 10 per cent, which would eliminate the current account deficit. This raises the question : how can the authorities reduce the real rate of interest by 4 percentage points? To answer that question we turn to the national account condition.

c. The National Account Condition

Since income is allocated either to consumption or saving and expenditure is allocated either to consumption or investment, the condition that income equal expenditure is the same as the condition that saving equal investment. If we then allocate saving and investment across the private and public sectors, the national account condition for a balanced current account is that the private sector balance (private saving minus private investment) plus the public sector balance (public saving minus public investment) equals zero.

Preliminary analysis by the Federation suggests that, when the real rate of interest is 2 per cent and economic growth is 4 per cent, the ratios of private saving and private investment to GNP are about 19 per cent and 20 per cent, respectively. With a private sector balance of minus 1 per cent of GNP, satisfaction of the national account condition for current account balance requires that the public sector balance be plus 1 per cent of GNP.

The key to eliminating the current account deficit while maintaining economic growth at 4 per cent a year is thus increasing the public sector balance. If Australian governments - the Commonwealth government plus the state and local governments - were to raise the public sector balance to 1 per cent of GNP the Reserve Bank would be able to reduce the real rate of interest to 2 per cent. The latter would ensure, directly, that the capital account condition for current account balance was met and, indirectly through the exchange rate, that the trade account condition was also satisfied.

REAL EXCHANGE RATE	>	EXPORTS = IMPORTS
\uparrow		,
REAL INTEREST DIFFERENTIAL	>	NET CAPITAL INFLOW = ZERO
1 I		
BUDGET BALANCE	>	INCOME = EXPENDITURE

In recent years the Australian government has made considerable progress in reducing the public sector deficit. Relative to GNP, the deficit was cut back from 7 per cent in FY84 to 2 per cent in FY88. The effects of policies already implemented or announced will reduce it to 1 per cent of GNP this year and could eliminate it in FY90. The discretionary measures required to produce a surplus equal to 1 per cent of GNP are thus not large in comparison with those that have already been taken.

3. The Gains to Farmers

The program for achieving current account balance would affect net farm income through three different variables - the budget, the interest rate and the exchange rate.

a. The Budget

The direct effect of the required budgetary change on net farm income depends on the magnitude of the change and on its incidence.

line with the Federation view that the public sector In is too large in Australia, we will assume that the budgetary change is wholly in the form of a reduction in government expenditure. With the program being designed leave economic growth unchanged we can assume that to will private consumption be largely unaffected. Further, if we assume that the additional investment required in the private sector to raise output in the foreign trade industries just offsets the reduction in investment in private sector industries catering to government-generated demand, the required reduction in government expenditure will also be about \$12 billion. Finally, if we assume that the incidence of the reduction uniform across households, the average farm household is will lose about \$2,500 in benefits from government.

This loss is, however, only temporary. From a national point of view the country will be required to borrow less and the gap between gross domestic product and gross national product will be reduced. In terms of household income the future benefit would most likely be reflected in smaller tax payments as the public sector's debt servicing requirements are lowered.

b. The Rate of Interest

Farmers will gain from a reduction in interest rates. Farmers are net debtors, and pay a much higher average rate of interest on their borrowings than they receive on their financial assets.

Gross debt of the average farm household is about \$70,000. A fall in interest rates of 4 percentage points would reduce average interest payments by \$2,800. To the extent that the policy changes reduced the risk element in loans to farmers, the fall in interest rates charged to farmers could fall by more than 4 per cent, in which case there would be a further decline in interest payments. Comprehensive date on financial assets of farmers are not published. However, available evidence suggests that financial assets of farmers are much less than their financial liabilities, that a considerable portion of these assets does not earn any interest at all and that the average rate on the remainder is relatively low. As a working, and probably very high, figure let us suppose that interest receipts amount to one quarter of interest payments. This would leave the average farmer with lower net interest payments of \$2,100.

c. The Exchange Rate

The major benefit to farmers from the program comes through the exchange rate.

Estimates by the Melbourne Institute and the Australian Bureau of Agricultural and Resource Economics suggests that real depreciation of 1 per cent increases average farm prices by about 0.7 per cent. This, in turn, raises production by around 0.3 per cent. The gross value of farm production thus rises by approximately 1 per cent, or \$1,200 per farm. Farm costs also rise, but only slightly, and net farm income increases by about \$1,100 per farm.

Elimination of the current account deficit calls for real depreciation, not of 1 per cent but of 10 per cent. The exchange rate effect of the package can thus be expected to increase net income of the average farmer by about \$11,000.

d. Total Effect

Our analysis suggests that policies designed to reduce the current account deficit to zero while maintaining strong economic growth could increase the net income of the average farmer by about \$10,500. The direct effect of a tighter fiscal policy could be a reduction in income of about \$2,500. However, the policies would also permit a reduction in interest rates which could add approximately \$2,000 to net farm income. They would also cause the real exchange rate to fall, which would provide a further boost to net farm income of about \$11,000.

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SOCIAL POLICY BONDS

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SUMMARY

Almost everyone can benefit from the more efficient and equitable provision of services currently provided by the government. Social policy bonds are suggested as a way of achieving that goal. The bonds, issued for whatever price they will fetch on the open market, would be redeemable for a fixed sum, but only when the specified social objectives have been achieved.

Key words: social policy, efficiency, bonds

1 BACKGROUND

Despite ever-increasing material prosperity western societies are plagued by seemingly intractable social problems. There is near unanimity over what needs to be done: unemployment must be reduced; housing, education, health services must be improved. Yet there seems to be a broad consensus in current political thinking that efficiency and compassion are conflicting goals: that these problems can't be solved until national prosperity is raised and some of the benefits trickle down to the less well-off.

The myth that social problems are best solved by this roundabout and protracted process is one that needs exploding if New Zealand or indeed the whole western world - is not to leave many of its citizens behind in the race for prosperity.

But a naive faith in trickle down is rife in policy making circles and has excused western government actions which have directly led to, for example, increases in unemployment and the cutting back of welfare expenditure. Such effects are undesirable - and should be unacceptable - in a society such as ours with highly developed technological and organisational skills. A hands-off approach by government is seen as an end in itself in many influential circles yet people are forgetting the supposed rationale for small government: that big government is inefficient and wasteful.

Social policy: current approach

Most people would agree on certain basic social objectives: full employment, for example or better health, education and housing. The way in which these objectives are currently targeted is, at best, indirect and haphazard: government encourages economic growth in the hope that the benefits will outweigh the costs and then tries, via the tax and welfare system, to effect some redistribution. So responsibility for solving social problems remains with, or is dispensed by, government bureaucracy - a byword for inefficiency.

Much of the debate about how to solve these problems has taken the form of a simplistic left-right shouting match with little

intelligent content. On the left we have the tired cliches of those who think government money alone can solve problems, who inhibit free trade and economic efficiency for the short term benefit of powerful groups of workers to the detriment of less powerful workers, the unwaged and the third world. On the right we have the apotheosis of self-reliance as a virtue: the smugness of those who succeed under the present system with their (guilt-induced?) contempt for those who fail. The problems remain unsolved.

Self-interest

Wealth generation is a complex process but in the communist as well as capitalist world it's gradually being realised that the most effective catalyst for the generation of wealth is self-interest. While we may not like the implications of this, it's a fact and if we recognize it we can channel self-interest into solving social problems, not just individual ones. In many countries governmentimposed constraints to self-interest have been slackened in recent years and wealth creation has become a more efficient process as a result.

But neither efficiency nor wealth creation has an ethical dimension. Self-interest, unmodified by a social conscience, has no social responsibility. It can generate more wealth but the distribution of that wealth to address social concerns remains problematic.

These concerns include such diverse expenditure items as social welfare, health services, education and other public goods such as highways, and the police force. Inefficiencies in their provision blight all the western world - as testified by those who slip through the social welfare net, the numbers of unemployed, those on hospital waiting lists or those illiterate after years of schooling. Poverty amidst plenty, obvious in the UK, the US and parts of Western Europe is in danger of becoming a feature of New Zealand life as well. The fact that these inadequate social services are paid for by many not so well-off citizens leads to a widespread cynicism (or resignation) about the possibilities of progress in a social democracy. The unsolved problems, combined with this jaundiced view of the virtues of consensus have already led to the ominous airing of extreme political attitudes.

Social problems should not have to rely on trickle down for their solution. They can and should be dealt with more directly and more efficiently. Apart from being a worthwhile end in itself their solution would bring more people into the productive sector and would allow the removal of many of the remaining constraints on free market forces. A more prosperous society, with fewer social problems, would result.

Why is society so inefficient in achieving its social objectives? The fact that their achievement is in the hands of government must be at least part of the answer. The system - though not the individuals working for the system - is inherently cynical: at the limit the solution of a social problem by a government institution can lead to the dissolution of that institution. More generally, at the day to day level, there is no relationship between the solution of problems and the rewards to those employed to solve them. So the pace at which the system moves is dictated by that of its least committed operatives. Without self-interest there will always be enough of these to inhibit attainment of society's objectives.

Very few government employees are given any tangible inducement to perform better. As a consequence it is only at the highest level of government that there is any correlation between efficiency and payoff. Even there the payoff, in the form of kudos to past or present governing parties is often misplaced, given the extreme complexity of today's economies, the time lags between a policy's implementation and its consequences, and the absence of convincing mechanisms to investigate government efficiency. It is still largely true that expenditure, unrelated to results, is seen as the measure of a government's commitment to achieving its social objectives. Attitudes are changing and it is now more widely recognised that throwing money at a problem does not inevitably lead to its solution, but attempts to save money often see the most cost-effective programmes cut back, while the most well-established, and often the most wasteful are allowed to continue. There is no mechanism to ensure that the most efficient programmes are encouraged, but there are usually sufficient entrenched interests to ensure that inefficient programmes remain.

The contracting out of social services to private bodies is often canvassed as a more efficient way of achieving society's objectives. At the local level contracting out of services previously supplied by government has led to increases in efficiency (for example in laundry services at UK hospitals). But opportunities for this sort of efficiency gain are limited to very specific services where performance is easily verified: generally single processes of a local, short term nature. Long term services, needing several processes, and being of a greater than local application cannot be contracted out in this way.

Neither is privatisation the answer: private agencies have private objectives and there is no intrinsic reason why these should coincide with social objectives. Privatisation, and the need to give shareholders a decent return on capital, all too often lead to the provision of services only to those most able to afford them.

So the contrast between the private and public sectors has sharpened in recent years. Deregulation and the freer operation of self-interest in parts of the private sector have made a lot of people very wealthy indeed. But the less well-off have gained little and market forces are often cited to justify measures that hurt the poor. It seems only fair that government should formulate social policy in such a way as to ensure that the less well-off also receive the efficiency benefits from a system where incentives play a more prominent role.

The question remains: how can self-interest be injected into social policy in a way which would benefit society as a whole? The next chapter describes a mechanism by which this might be achieved.

268

2 DESCRIPTION

How can self-interest be harnessed into making the achievement of social objectives more efficient?

In essence the achievement - but not the setting - of social objectives is contracted out to the private sector via a free market in a new sort of financial instrument: government-issued social policy bonds (SPBs). First a word about conventional bonds: these are issued by a government (or government agency, or private company) as a means of raising money. Normally bonds are redeemable for a fixed sum, at a fixed date and yield a fixed rate of interest. Often they are issued to raise money for a specific purpose; to fight a war, or to finance particular engineering projects. My proposal is to issue bonds which are not redeemable at a definite time in the future, nor do they bear interest. They are bonds which are redeemable only when the government objective in question has been achieved. Social policy bonds would be issued by government at whatever price they will fetch on the open market and thereafter could be bought and sold by any willing individual or institution at their free market price. Once the targeted objective had been achieved they would be redeemable, as are conventional bonds, for a fixed, predetermined sum. They therefore differ from conventional bonds in that they would have an uncertain redemption date, which, in combination with a fixed redemption value, implies an uncertain yield. Also, the initial sale and redemption of the bonds would involve a financial loss to the government. Importantly this loss on the bond issue would be offset by the financial and social benefits of objective achievement.

The operation of the scheme can best be explained by considering an example. Take the objective of the reduction of unemployment. Assume that a fixed number of bonds is issued, redeemable for \$10 only when unemployment is down to, say, 20000. These bonds are floated, nationally and overseas, on open tender as at an auction: those who bid the highest price for the limited number of bonds available will be successful. Importantly all bonds would find a buyer: the price might be very low, but the bonds will all be sold. What factors will determine the price of these bonds? Most obviously the market's assessment of how likely and when the objective will be achieved. Interest rates on alternative investments will also be a factor. The bonds could go for as little as 1 cent if people thought there was virtually no chance of this particular government objective being achieved in their lifetime. People will of course differ in their assessment of the value of the bonds and their views will change with time as events make achievement of the targeted objective a more or less likely prospect. But the bonds once issued would be transferable at any time; market prices would be publicly quoted just like those of ordinary bonds, or shares.

Let's assume now that the bonds targeting unemployment have been issued and sold. The opening value of the bond might have been say \$2.50. People, or institutions, now hold bonds which can quadruple in value once unemployment is down to 20000. The government has nothing more to do: the holders of the bonds now have a strong interest in seeing the value of their bonds increase as quickly as possible. (If other people's interest is stronger they will bid more for the bonds than the current holders think they're worth and will thus own them. So SPBs will generally be in the hands of those with the strongest interest in seeing the objective attained.)

Who would buy the bonds?

1 Fassive investors hoping to make a capital gain. These would include:

a casual purchasers who might buy bonds in the same way as they would a Lotto ticket. They would hope to hold onto the bonds until redemption, or until the market price of their bonds had risen sufficiently high for them to enjoy a worthwhile capital gain.

b speculators who know, or think they know, that the likelihood of the objective being achieved is greater than the rest of the market thinks it is, and that the bonds are therefore underpriced. They would similarly hope to make a capital gain from holding the bonds.

c perhaps the most important category of passive investor is the hedger who, in the absence of the bond issue, would stand to lose if the particular social objective were achieved. Hedgers would buy the bonds as a form of insurance policy against this possibility. In the unemployment example passive investors in this category might include proprietors of video game parlours or the manufacturers of inferior goods (goods such as cheap foodstuffs for which demand declines as incomes increase).

Passive investors wouldn't do very much about achieving the objective. Their bonds, though, would encourage them to support, or to moderate their opposition to, objective-achieving initiatives. But the success of the bond issue would depend on

2 Active investors including:

a specialist brokers who would buy the bonds from the government or other holders, and who would then finance initiatives that would help achieve the objective. They could use their own capital, or borrow on the strength of the redemption value of their bonds, in order to support such projects. These purchasers' motivation will come from the expected capital gain they will enjoy as the bond price rises with the enhanced probability that the objective will be achieved early.

b organisations directly implementing the objectives whose bondholding would directly enhance the profitability of any actions they take which would help in achieving the objective.

Active holders, in this example, could be expected to increase employment by using part of the present value of their expected above-normal yield from early redemption of the bonds to finance their own, or others', labour recruitment drives.

Examples of the initiatives which would be taken by active holders would be:

--defraying the cost of recruitment to existing or new enterprises --supplementing the income of prospective employees

-supprementing the income of prospective employees

--matching vacancies with those currently unemployed

--defraying costs of training or transfer of new employees.

The bond issue can also be expected to lead to other unemployment reducing activities, whose precise nature may not be known in advance. (Much will depend on the definition of unemployment used: for instance the objective could be defined in such a way as to encourage jobsharing initiatives.)

Prospective holders of the bonds would have an incentive (and given free capital markets, the means) to buy them from current holders if they think they can do a better job of achieving the government objective. Thus the provision of the means by which the objective is attained is not in the hands of entrenched interests. Note that this also applies to passive bondholders of the (a) and (b) categories (passive holders who are not insuring against achievement of the targeted objective). If these investors have sufficiently large holdings of the bonds they will be highly motivated to become active rather than see their returns from bondholding suffer as the targeted objective becomes an ever more remote possibility. By becoming active themselves these bondholders will increase the likelihood of early redemption of the bonds.

Many of the initiatives which would be stimulated by the unemployment reducing bonds of the example are to some extent taken by governments nowadays, but the critical difference is that with the bond method the initiatives are stimulated by the self-interest of the bondholders and are not operated by a bureaucracy which, however well-intentioned, is not rewarded in ways which correlate to its success in objective-achievement. SPBs provide a strong motivation for bondholders to seek out those ways of reducing unemployment which will give them the best return for their outlay.

The bonds direct self-interest into those processes necessary for objective-achievement that will respond most readily. The government does not have to plan this: it is the self-interest of bondholders that ensures it. Current efforts by government generally focus on the most obvious symptom of a social problem not on the problem as a whole. Thus an inefficient industry on the verge of bankruptcy might receive vast amounts of taxpayers' money at the expense of cheaper job creation initiatives. Social policy bonds improve on ad hoc arrangements of this kind which are not only inefficient but also expose decision-makers to bribery or corruption. Another significant advantage over conventional policy is that government pays only when the targeted objective has been achieved.

The next chapter considers some objectives that might be targeted by SPBs, and looks at some practical aspects of their application.

3 APPLICATION

Areas where social policy bonds would be expected to show the most marked improvement over existing government-influenced methods of objective achievement would be those where financial rewards to those currently involved in objective-achievement are not related to the degree of attainment of the objective. There are many areas like this, where government is the principal player. Some of these areas, and examples of how policies within them could be substituted by SPBs are:

--Crime prevention: Currently touted methods of combatting crime are longer sentences for convicted criminals and more money for the police force. SPBs would hone in directly on what society actually wants to achieve: they would target numbers of reported crimes.

--Employment: SPBs targeting unemployment could replace a wide range of measures including protectionist barriers to imports of labour intensive manufactures which are aimed at maintaining employment in certain industries. Here the efficiency gains from SPBs which target unemployment directly would be dramatic.

--Health: Priorities for health services are strongly influenced by groups of medical specialists with little incentive or capacity to see improvements in the *general* health of the nation as an objective. So funding of these specialities depends on the strength of their lobby groups. And what is arguably the most efficient way of spending the taxpayer's health dollar - preventive medicine - receives derisory funding because it has no powerful lobbyists.

Targeting general indicators of well-being - life expectancy, infant mortality, disability - would ensure that scarce resources are allocated in ways which would directly achieve *society's* health objectives. The bonds would divert, impartially, government funds into those areas of the health service (or they would encourage the exploration of new areas) that would most efficiently use them to achieve the targeted objectives.

--Housing: SPBs might target the numbers of homeless, or the number of new approved housing units completed, or occupancy rates of the existing housing stock.

--Education: SPBs could target results achieved in basic literacy and numeracy tests taken by schoolchildren.

--Pollution: SPBs could target nationally averaged levels of water or air pollution.

With all these examples there would be difficulties in the specification of the objective to be attained. 'Approved housing units' for instance, or 'reported crimes' could be subject to varying interpretation or to deliberate attempts to falsify the information required to monitor achievement of the objective in question. But these difficulties are not insuperable as long as the following three processes are soundly carried out:

1 quantification

The objective must be capable of being quantified or there must be a strongly correlated proxy for the objective whose targeting would inevitably result in the objective's being achieved.

2 definition

Careful thought will have to be given to the definition of the objective targeted by the bonds. Consider the unemployment example. It would be unsatisfactory to redeem the bonds when unemployment was down to a certain level for a short time only. The objective is a *sustained* level of low unemployment and this is how it would have to be defined when the bond is issued.

3 monitoring

All bond issues will require reliable and accurate monitoring of the targeted problem so that progress towards the attainment of the social objective can be reliably and unambiguously assessed. This surveillance must also be seen to be independent of government or interest groups, both of which could benefit unfairly from dubious data collection. The nature of the monitoring (whether it's carried out at local, regional or national level for example, or the level of aggregation at which independent organisations are involved) would depend on the objective being targeted, and to some extent, on the amount of government money at stake.

The market for social policy bonds

For the SPBs to work it is essential that active investors purchase the bonds and directly, or indirectly, help to solve social problems. But there is no need artificially to boost investor interest in the bonds: the anticipated supernormal profit arising from early redemption of the bonds generates the required self-interest and so supplies the motivation for achieving the government's social objective *provided* there is a buoyant market for the bonds.

SPBs, once issued and sold, must be readily tradable at any time until redemption. This is critical to the operation of the SPB mechanism. Many bond purchasers will want, or need, to sell their bonds before redemption - which may be a long time in the future. If there were no secondary market these holders would not be able to realise any capital appreciation experienced by the bonds. This would remove much of the incentive to purchase the SPBs when issued.

But there is another important reason for requiring a healthy secondary market in the bonds: active investors may be able to speed up only one, or a few, of the processes necessary for the targeted objective to be achieved. Once these investors have done their bit, and seen the capital value of their bonds increase in line with the resulting increased probability of the bonds' early redemption, they may have no wish to speculate on the speed at which the remaining processes will be carried out. Other groups of active investors, who will have greater expertise in performing these later processes, must be given an incentive to use their expertise to accelerate attainment of the objective. The possible capital appreciation of bonds bought from previous owners and sold at a still higher price (or redeemed) provides this incentive. The new owners will, if they are successful in these later stages, realise this capital appreciation. The secondary market is also necessary from the government's point of view. Government could, as a competitive supplier of objectiveachieving services, participate as an active investor in the SPBs. But it should also be able to participate as an passive investor.

Government, while it may profit from appreciation of the bonds it purchases, will also be interested in the cost of its social policies. The SPB principle is superior to existing budgetary mechanisms in that the cost of each scheme is not only inexorably linked to attainment of its objective, but its maximum cost can be decided in advance. The number of bonds is limited and the most the scheme could cost the government would be the cost of redeeming the bonds very soon after they are issued (this assumes a negligible issue price) plus all the administrative costs. Even then though, the objective will have been achieved before any cost is incurred.

The efficiency of SPBs could be tested by allocating the same sums of money as are currently allocated for a particular social objective to the redemption of SPBs which target the identical objective. The maximum cost to the government of the issue could then be set so as not to exceed the expenditure that would anyway have been incurred in pursuit of the same objective.

We should note that SPBs will allow for the complexity of social problems. No single approach will solve them so a wide variety of approaches to their solution is essential. SPBs will encourage and reward the most efficient of these approaches. This occurs because of the nature of the bond mechanism, and requires no selection or supervision by government (or government agency) of the most efficient policy. Only the objective, not the policy, is dictated by government. This feature tends to stabilise the political environment. Obviously the objectives will have to be carefully defined but there are extremely important objectives for which a wide - in practical effect, unanimous - consensus exists: lower unemployment; better health, education, housing, or reduced crime levels, for instance. A government is unlikely to repudiate such universally desired objectives even if the associated SPBs were issued by ruling parties with a different political outlook. The risk that it might (and so become the first government openly to support higher unemployment, worse standards of health care etc) would be not much greater than that of the government refusing to redeem fixed interest stock issued by any of its predecessors. This risk, always present, in no way impedes the operation of bond markets.

Lastly: the impact of SPBs on the money supply. In the short run each bond issue taken singly, and especially if the objective were not a distant prospect, could be deflationary: the money supply could be reduced considerably if a popular bond sold for a high price on flotation. However, in the long run, with careful choosing of targets and a constant counterpoint of bond flotation and redemption, the effects of SPBs on the money supply could chime in with any desired monetary strategy.

The next chapter looks in some detail at the efficiency and distributional aspects of SPBs.

4 EFFICIENCY AND DISTRIBUTION

Economists generally evaluate policies on the basis of two criteria: efficiency and distribution. (Distribution here means the distribution of income and wealth amongst the population.) Often society's efficiency and distributional objectives conflict. With social policy bonds conflicts of this sort can arise both with the choice of objective to be targeted (ends) and in the specification of that objective (means).

Ends

Imagine that national prosperity - or a proxy for it such as Gross National Product - could be adequately quantified and were targeted by a bond issue. Then bonds might be issued which would be redeemed only when the rate of growth of GNP had remained at 5% or greater, per annum, for 10 years. SPBs would, we can assume, be an efficient way of achieving this objective; but we should note how limited this objective is. It says nothing about the distributional effects of target hitting. A significantly higher GNP, while looking impressive in league tables, would hardly conform to society's preference if almost all the increased prosperity ended up in a few dozen pairs of hands. Society would willingly accept a lower growth rate if the extra GNP could be more equally distributed.

SPBs give no indication as to how policies are going to be achieved. Thus targeting a national economic objective (so as to raise GNP, for example, or to reduce inflation) may well lead to adverse distributional or other socially negative consequences. These negative effects could be targeted by other bonds or ad hoc legislation but it would be much better for each bond issue to ensure that distributional problems are not aggravated for two main reasons: 1 because the negative effects would be difficult to anticipate, and 2 because in the absence of a foolproof social safety net some, perhaps many, of those whom society considered already disadvantaged could be adversely affected and remain uncompensated for the further decline in their standard of living.

It is for this reason that I have called the bonds *social* policy bonds: initially at least the bond principle should be used to fulfil social policy objectives whose achievement would definitely not hurt the underprivileged. They should target explicitly objectives whose achievement would improve the distribution of income or wealth within society. There are always winners and losers when policies are implemented and in the end society's distributional criteria cannot be precisely, or unanimously defined. But it is important that the bond principle's efficiency improvements should not conflict with broadly accepted distributional objectives.

With more highly developed transfer and welfare systems, which could ensure that society's distributional objectives will be met under any circumstances, the bond principle could be applied beyond social policy objectives. Then cross-subsidisation of bond issues could occur...for instance: bond issues that raised manufacturing productivity, or export earnings, or national prosperity generally, could subsidise those that targeted purely humanitarian objectives such as reduced infant mortality, or better care for the elderly.

<u>Means</u>

From the *efficiency* point of view it appears that the more broad the specification of the objective the better. For instance: it would be more efficient to target the national total of unemployed than to aim to make the same cut in the total by targeting the regions separately. Targeting total unemployment in this way would imply that we are indifferent between, say the loss of 1000 jobs evenly distributed around the country and the closure of a large factory employing the same number of workers in a small provincial town.

In general to the extent that we are not concerned about <u>who</u> is unemployed, or which particular young children benefit from lower infant mortality, or who benefits from social policies specification of these targets in terms of national totals makes sense in that the bond target would correlate quite closely with society's aims. More specific distributional objectives - reducing unemployment amongst ethnic minorities for instance - could, of course, be targeted, though with some loss of efficiency compared to the targeting of a reduction in the total unemployed by the same amount.

It is worth emphasising here that any distributional criteria have to be explicitly specified as the bond's objectives. The SPB mechanism will not allow policies to be justified on the basis that a particularly deserving group *might* benefit if they are implemented. This is an improvement on current policy where gains to deserving groups are cited in favour of policies which benefit them only peripherally, if at all, and where most of the benefits often accrue to those whom - if society had been given the chance to identify them would be considered much less deserving cases.

The question of the optimum breadth of specification of the targeted objective can be approached from another angle. Assume that we target the level of atmospheric lead in a bond issue. It might be that targeting lead in this way would cause people to increase their use of subtitutes - which could be more dangerous than the original levels of lead. One way of anticipating this problem would be to aim initially at unambitious reductions in the lead level. Depending on the effects of this reduction on the use of offending substitutes, other bonds could then be issued targeting the substitutes, or further targeting the level of lead.

But a better approach might be to target, more comprehensively, atmospheric pollution. This could be expressed, perhaps, as an index of atmospheric pollutants weighted according to their lethality and other factors.

We should note that the same problem occurs in conventional policy, where efforts to promote or cut back on particular activities can give rise to unforeseen and undesirable side effects. By choosing the optimum breadth of objective specification - in this example: by targeting atmospheric pollution as a whole - the bond principle can minimise this possibility.

Taken together the efficiency and distributional criteria provide a useful framework for looking at the advantages of social policy bonds over conventional government policy:

Advantages of social policy bonds

1 The main advantage of SPBs is that they make the achievement of social objectives more efficient by injecting self-interest into every stage of the process. Thus efficiency in the attainment of distributional aims is improved. For the same government expenditure, therefore, more could be achieved in the social policy area. Additional gains accrue for other reasons:

2 The bonds guarantee stability of policy objectives. Policy instability is an important reason why people do not undertake projects or activities that could benefit society. Objectives with a necessarily long lead time (for example: to reduce levels of water pollution to half current levels) could be targeted by SPBs and holders of the bonds would not be deterred from taking measures to achieve them by fears of a reversal of government policy - or indeed, a change of government. In the current policy making environment decisions about projects are plagued by policy uncertainty arising from government decisions which are subject to all the whims and inefficiencies of political expediency. Uncertainty also surrounds the behaviour of the aspiring political parties which differ not so much in their stated objectives but, more critically, in the ways they will strive to achieve them.

3 The bonds make policy objectives more transparent. Apologists for current policies often point to benefits which can result only haphazardly - if at all - from their implementation. SPBs would ensure that objectives are explicitly identified, and that indirect methods of achieving them would be encouraged only if they were efficient.

4 A less obvious distributional benefit would arise from the existence of a means of acquiring wealth where private gain is strongly correlated with public benefit. Many bondholders would be rich, and, if their bonds were redeemed early, they would become richer. But this socially acceptable way of acquiring wealth would allow other, less socially beneficial forms of wealth accumulation (inheritance, or activities of little social benefit), to be taxed more heavily.

Extension of the bond principle

The bond principle will have to be applied, developed and refined before it can supplant the role of government as we know it. But once solutions to society's distributional problems are found the bond principle can be used in other areas. Bonds could, for instance, be used to target quantifiable components of national prosperity.

In the very long run the widespead acceptance of the fact that selfinterest is the most effective catalyst for change can have more farreaching implications, transcending national boundaries. Supranational problems - war, famine and disease - might be made the targets of internationally backed bond issues. This, however, is a long way into the future. The next, and final, chapter, looks at some of the problems involved in fitting national social policy bonds into the current political environment.

5 INTEGRATION

Integrating social policy bonds into the current political system will need new approaches to budgetary planning and policy making.

Budgetary planning

SPBs, at first sight, would be difficult to incorporate into conventional budgetary planning. The time profiles of costs of, and benefits from, SPB issues differ markedly from those associated with current policies. At this stage not much needs to be said: SPBs could initially be used as supplements to, rather than substitutes for, existing policies. Experience gained in this transition stage could be used later, when the size of major bond issues demands that their effects on government income and expenditure be more accurately anticipated. But note that the possibility, at any time, of government purchase and sale of the bonds can be used to remove much of the budgetary planning uncertainty. Also note that explicit targeting of objectives is likely to lead to explicit calculation of the value of their achievement - a useful discipline, but one rarely followed by today's politicians.

Policy making

The most significant problem concerning the integration of social policy bonds into current policy making procedures is probably the incentive they will give for bondholders to achieve the specified objectives at the expense of other societal goals.

Illegal activities could be dealt with by existing laws, backed by a system of bondholder registration which would identify those with the largest incentive to commit them. Unfortunately there may be activities undertaken by bondholders in pursuit of a targeted objective which, while not illegal, conflict with society's other interests. Possible negative activities would differ according to the targeted objective. Obviously the drafting of the bonds would have to exclude these as far as is feasible but it is always possible that unforeseen negative - but legal - activities could be undertaken by bondholders to bring about early redemption. The discussion in the previous chapter considered as an example the possibility of substitution of untargeted pollutants for targeted ones. Objectives which are complementary and which, if not pursued jointly, could conflict, should therefore be targeted by a single bond issue.

A number of safeguards could also be used against *unforeseeable* negative, but legal, activities undertaken in pursuit of a targeted objective. These could include the following:

--- registration of bondholders with the aim, if necessary, of encouraging (or bribing) them to achieve targeted objectives only by socially acceptable means

--- provisos on the bonds specifying indicators of social welfare which, while not explicitly targeted by the bond issue, must be satisfied for the bonds to be redeemed. These provisos could be used to prevent the undertaking of activities with adverse effects to bring about attainment of the targeted objective. Thus SPBs targeting unemployment could embody provisos to the effect that the bonds would not be redeemed if the emigration rate, say, or the inflation rate, exceeded certain specified limits. Or:

--- multi-targeted bonds, with more than one objective could be issued.

In more extreme circumstances the government could, once the bonds had been issued:

--- introduce ad hoc measures to make the negative activities illegal or to mitigate their effects

--- declare a particular bond issue invalid and compensate the current bondholders according to a formula related to the price they paid for the bonds.

These dangers should not be overstated. It is likely that existing laws, combined with careful choice and specification of the bond objectives would make the use of these safeguards unnecessary. And the question of how well social policy bonds would achieve societal goals needs to be considered alongside current policy making methods. There have been many instances in conventional policy making where the actual results of a policy are not just unintended, but often run counter to the original intention. Thus, rent controls, intended to benefit tenants, have discouraged landlords from letting property. The result is that private rented accommodation is harder than ever to find, so that rents have increased. Again, policies intended to benefit manufacturing workers - such as import barriers for manufactured products - have hurt the very people they were intended to help.

If single policies are sometimes difficult to get right in today's policy making environment then combinations of policies frequently result in interactions which are unforeseen and unforeseeable. Policy makers in today's environment can escape or deflect censure because the adverse results of their policies are difficult to relate to their cause. Violence, drug-taking, and petty crime, for example, are all blamed on anything from television, to this government, the previous government, the wartime traumas of a previous generation...and so on. If SPBs were to lead to negative effects the relationship between these effects and their causes would be identifiable and the filtering out of negative effects would be a simple matter compared to the methods available to today's policy makers.

Another possible problem arising from the integration of SPBs into the current policy making system arises from government's role as creator of statutes. Laws affecting the bond price could be passed. For instance: government could come under great pressure not to increase unemployment benefits from holders of bonds targeting unemployment. Once again, however, the source of the pressure, and the motivation for it, would be easy to identify. In any case the threat of such pressure has a positive aspect: for bond issues to be as successful as possible governments would have to give assurances as to their future behaviour. This could be another means by which SPBs stabilise political objectives.
Conclusions

Resources are always limited and social policy bonds will not change this. Priorities and choices will always have to be made: under the bond principle the choice of problems for which bonds are issued and the funds allocated to their solution will remain in the hands of governments with all their imperfections.

Yet the advantages of the bonds over existing policy instruments are not insignificant. Social policy bonds will achieve society's distributional objectives more efficiently, and less randomly, than the current combination of ad hoc policies and trickle down. The bonds would also lead to more stable policy objectives and a more transparent policy making process. There would be other benefits too, arising from the existence of a means by which private gain is correlated to social benefit. And lastly: the bond principle allows any adverse effects of government policy to be much more reliably traced to their source than does a conventional policymaking regime.

Of course, the surrendering of policy instruments to the private sector - even with the aim of achieving social objectives - will be politically difficult, and must be a gradual process. But the potential benefits cannot be ignored. Social expenditure on education, health, pensions, unemployment benefit and other items has been growing very rapidly in the western world. In the OECD countries it now accounts for a quarter of gross national product - as against 14% in 1960. Even the relatively small gains in efficiency which would arise from cautious trials of the bond principle will prove extremely significant to those most in need.

MACROECONOMIC POLICY, THE REAL EXCHANGE RATE AND AGRICULTURAL GROWTH: THE CASE OF ECUADOR

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Paper presented to the Annual Conference of the Australian Agricultural Economics Society (N.Z. Branch) Blenheim, July 1988

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ACKNOWLEDGEMENTS

This paper has benefitted from discussions with Dr Domingo Cavallo of the Fundación Mediterranea, in Córdoba, Argentina; Econ. Ramon L. Espinel Martinez of Finanquil, in Guayaquil, Ecuador; Drs David Franklin and Duty Greene of Sigma One Corporation. The paper is part of a project being conducted by Sigma One Corporation with the Policy Analysis Unit of the Ministry of Agriculture and Livestock in Quito. It is supported by a contract from the United States Agency for International Development (LAC-0051-C-00-6006-03). The authors are solely responsible for the contents and the views expressed, which in no way necessarily represent those of the Ministry or of the United States Agency for International Development.

MACROECONOMIC POLICY, THE REAL EXCHANGE RATE

AND AGRICULTURAL GROWTH IN ECUADOR

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" Strengthening agriculture is not just an issue of agricultural policy, per se. Exchange rate and trade policy have been the main policy instruments affecting Latin American agriculture".

G. Edward Schuh (1987)

SUMMARY

Agricultural growth is determined by policies which are specific to the sector, and by the broader economic policies which have economy wide implications. This latter set has been increasingly recognised as having a dominant influence on the evolution of the agricultural sector in Latin America. This paper analyses the impact of macroeconomic, trade and exchange rate policy on the relative performance of the agricultural sector in Ecuador. The central focus of the paper is the influence of these policies on the real exchange rate, measured as the price of tradable to non-tradable goods. Changes in the real exchange rate are then used to explain the evolution of intersectoral output in the Ecuadorean economy from 1960 to 1986. A series of policy simulations are undertaken, to estimate the relative output of the agricultural sector which would have been observed had a different mix of policies been adopted. The results reinforce the importance of macroeconomic and foreign trade policies in shaping the growth of the agricultural sector in a small open economy.

Key Words: macroeconomic policy, commercial policy, exchange rate policy, real exchange rate, agricultural output.

1. INTRODUCTION

Since the beginning of the 1980's, Ecuador has faced extremely complex choices concerning the performance and growth of the economy. Natural disasters have compounded the problems stemming from volatile world commodity prices. Recovery from the impact of both the global recession in 1982-83, and the rise in international real interest rates, has been hampered by the dramatic decline in petroleum prices since 1986.

Exogenous changes in world prices, in the weather patterns, in the demand for exports, and in access to foreign markets have unquestionably influenced the country's economic performance. Recent declines in the unit prices received by Ecuador for petroleum, coffee, shrimp and cocoa have been dramatic (Banco Central, 1988, p.42).

It is clear that in interpreting the economic record of Ecuador, these random forces, which have buffeted the economy both favorably and unfavorably, must be given due regard. But at the same time, it would be unduly simplistic to rely solely on these factors to explain economic performance. Evidence from many countries and time periods suggests that such measures as the rate of growth in income, the size and composition of the tradable goods sector, the levels of inflation and unemployment, and the relative rates of growth of different sectors of the economy, are systematically related to the economic policies which are adopted. Furthermore, while economic policies are an important determinant of long-run trends in economic performance, they also condition the nature and magnitude of the economy's response to the unanticipated short term random shocks in output and prices.

In short, both the long term performance of the economy, and the way it adjusts to short term shocks are fundamentally related to the nature of prevailing economic policies. In this paper, we focus on the performance of the agricultural sector in the context of the mix of economic policies that were adopted in Ecuador. The next section provides a sketch of the nature of economic policies in relation to the agricultural sector, which is followed by a capsule view of the performance of the agricultural sector. This leads to a discussion of the real exchange rate as the central variable in the model. The results are given in the following section. The model is subsequently used to simulate the effect of a range of macroeconomic and trade policies on the relative output of the agricultural sector.

2. AGRICULTURE AND ECONOMIC POLICY

In the past, it was customary to focus attention on the agricultural policies of a country when examining the impact of policies on the performance of the agricultural sector. Broadly speaking, these sector specific policies could be classified as either expenditure or incentive policies (Valdés, 1986, p.161).

While the distinction is sometimes blurred, expenditure policies typically embrace investments in storage, transport, electrification, irrigation and drainage, and agricultural research. In contrast a range of policies are used to alter the economic incentives facing the sector, including measures such as minimum producer price schemes, subsidised credit or crop insurance, taxes or subsidies on inputs (eq. machinery and fertiliser), together with interventions in agricultural trade.

In contrast to this focus on the role of policies designed specifically for the agricultural sector, it has become increasingly evident that the performance of the sector is greatly influenced by economy wide policies (Garcia, 1981; Schuh, 1976, 1986 and 1987; Orden, 1986; Lambert, 1986:). In fact, it may often be the case that any impact of a sector specific policy is negated by the broader set of economic policies adopted by the country which have "unintentional" consequences for agriculture. Subsidised credit or under-priced irrigation water for rice production may constitute no more than partial compensation to domestic rice producers for the penalty imposed on them by, for example, the costs of their inputs inflated by the tariff protection accorded to the domestic manufacturing sector.

Alternatively, the economy wide policies which tend to penalise the agricultural sector (such as maintaining the domestic price of foreign currency below its market value) may accentuate the damage done to the sector through the imposition of export taxes on specific products. The historical taxation of exports of Ecuadorean coffee and cocoa are a case in point (Keeler, Scobie and Greene, 1987).

It is understandable that past analyses of agricultural performance in developing countries tended to focus principally on agricultural sector policies (and of course the implications of supposed changes in the external terms of trade). The prevailing conditions and institutional arrangements prior to the early 1970s were such that it is conceivable (although debatable), that agricultural sector policies were, in some cases, of greater significance than macroeconomic policies in shaping the evolution of the agricultural sector. There are a number of possible reasons for this. While the Bretton Woods accord was still operative nominal exchange rates were supposedly "fixed". Despite periodic adjustments that were often themselves destabilising, there were periods when the prices of foreign currency were relatively stable. In addition, the volume of international trade and especially capital flows was very much smaller than today; prices on international markets were less volatile, and the transmission of the impacts of macroeconomic policy among countries was less complete than today. In short, the international economic environment in which a small open economy functions today, differs markedly from that prevailing for more than 25 years following the Second World War.

For this reason, the fundamental proposition on which this study is based is that the interpretation of the performance of the agriculture sector, relative to the rest of the economy, must be based on the influence of economy wide policies. Particular attention is focussed on the influence of the commercial, nominal exchange rate and macroeconomic policies. An attempt is made to quantify these policies and to measure their impact on the real exchange rate, a crucial variable determining the incentives facing agriculture in a small open economy.

3. AGRICULTURAL PERFORMANCE IN ECUADOR

The performance of the agricultural sector in Ecuador has been poor for close to two decades. The growth in real output has been below that of other sectors in most years. Overall growth of agriculture has only just equalled the rapid rate of population growth, with the consequence that output per capita today is virtually no higher than it was in 1960.

Figure 1 shows the marked contrast in the growth rate of agriculture and manufacturing. Throughout the 1960's and 1970's the growth of agriculture was markedly below that of manufacturing. In part this reflected the deliberate policy choice to stimulate import competing industrialisation as a fundamental strategy of economic development in Ecuador.



Figure 1: Sectoral Growth - Agriculture and Manufacturing (annual average percentages)

In contrast, despite an increase in public resources channelled to the agricultural sector in the form of subsidised credit and investment in infrastructure, agricultural growth fell to 2.3 percent per year, significantly below the rate of population growth. This in itself suggests that an explanation for the performance of the sector has to be sought outside the sphere of agricultural policy per se.

The 1980s brought a severe economic crisis with rising real international interest rates, a world recession with its attendant fall in the demand for Ecuador's exports and a sudden change in the access to foreign credit. In the agricultural sector this difficult situation was compounded by extreme climatic conditions in 1982-83. Starting in 1981, a whole series of significant policy chan-

ges were initiated. Predominant among these was the move to greater flexibility in nominal exchange rate policy, in domestic interest rate policy and in commercial policy. The net effect of these changes was to create an economic environment that lead to a notable recovery in agricultural growth in the period 1984-86 (Figure 1). During this period, agricultural output grew faster than in any other three year period in recent history.

In this paper we focus on the broad pattern of agricultural growth relative to other sectors of the economy. The central hypotheses to be examined are:

(a) that pattern of intersectoral growth can be explained by the structure of economic incentives, as encapsulated in a measure of relative prices facing the sectors; and

(b) that a broad range of macroeconomic policies play a predominant role in shaping the course of those key relative prices.

A simple model encompassing these propositions is set out in the following section.

4. THE MODEL

The central element of the model is the real exchange rate. This is defined as the price in domestic currency of tradable goods relative to that of non-traded or home goods. It is this relative price that determines the social profitability of agriculture (and other traded goods) in relation to all other goods and services.

The fundamental distinction between tradable and non-tradable goods concerns the mechanism for price formation. The prices of home goods are determined by the interaction of market forces in the domestic economy, and not directly influenced by developments in the rest of the world. In contrast, the domestic prices of traded goods are a reflection of world market conditions which determine the border price of exportables and importables, together with exchange rate and commercial policies which convert the border prices in foreign currency, to prices in sucres received by domestic producers or paid by domestic consumers.

The real exchange rate (RER) is then defined in the following manner:

$$D_h(P_h) - S_h(P_h) = 0 \tag{1}$$

$$P_t = E.P^w.(1 + T) \tag{2}$$

$$RER = P_t/P_h \tag{3}$$

where equation (1) specifies that the price of home goods (P_h) is formed under the assumption that the excess demand is zero, while equation (2) describes the formation of the price of tradable goods based on the world price at the Ecuadorean border (P^w), the nominal exchange rate (E), and a variable (T) capturing all the interventions in taxes and subsidies to traded goods.

The importance of the real exchange rate as the measure of relative sectoral profitability in agriculture stems from the highly open nature of the agricultural sector. A very high proportion of total value added in agriculture comes from the production of tradable goods. In contrast to agriculture, the rest of the economy (with the notable exception of the petroleum sector) is characterised by a very much lower proportion of economic activity coming from the tradable goods sector (Scobie and Jardine, 1988a). For this reason whatever policy interventions or exogenous changes in Ecuador's economic circumstances alter the relative profitability of producing tradable goods (in other words the real exchange rate as defined in equation (3)), are likely to have a disproportionate effect on the agricultural sector. The first equation of the model describes the formation of the real exchange rate. The studies by Cavallo and Dadone (1986), Cavallo, Cottani and Khan (1985), Edwards (1985) and the review by Valdés (1986) have been used to provide guidance as to the range and formulation of variables that could be expected to be important in explaining the real exchange rate in Ecuador.

The relationship can be denoted as follows:

RER =
$$f{TOT, CG, CAB, MONEX, (1 + t_m), (1-t_x)}$$

(4)

where

TOT = the international terms of trade facing Ecuador, defined as the ratio on an index of import prices to an index of export prices, both in foreign currencies;

CG = government consumption expenditures as a ratio of GDP;

CAB = current account balance as a ratio of GDP;

MONEX = rate of expansion in M2 less the rate of change in the nominal exchange rate, corrected for the rate of international inflation and the rate of real income growth in Ecuador;

 $(1 + t_m)$ = the average equivalent tariff on importables;

 $(1-t_x)$ = the average equivalent tax on exportables.

This formulation (which is highly reduced form in nature) encompasses elements of a number of approaches to exchange rate determination (Harberger, 1986) including the elasticities approach, the absorption approach and the monetary approach. The role of each of the independent variables is now discussed in turn.

Terms of Trade (TOT)

An improvement in the terms of trade through higher export prices increases real income, and the resultant expansion in demand for all goods would raise the price of home goods, so reducing the real exchange rate. The substitution effect also acts to shift the demand away from exportables and toward home goods, reinforcing the income effect on the real exchange rate.

If on the other hand, TOT improves due to a fall in the border price of importables, then demand will switch into importable production while resources will move out. The level of imports will rise and the ensuing deficit on the current account will devalue the exchange rate. Note however that the income effect of the price fall will increase the demand for non-traded goods and the real exchange rate will fall. The net effect of the opposing price and income forces must be resolved empirically (Valdés, 1986). The question is further compounded by allowing for the possibility that agents perceive the changes as temporary rather than permanent (Edwards, 1985). This distinction is not drawn in the current analysis.

Public Consumption (CG)

An increase in CG (in relation to GDP) will result in a budget deficit, which starting from a position of sustainable equilibrium will cause domestic absorption to exceed real income, and leave a balance of payments deficit. To the extent that a decline in net foreign assets is used to finance this extra spending the RER will decline, penalising the agricultural sector. The extent to which public sector imbalances have resulted in an increase in foreign liabilities in Ecuador is documented by Scobie and Jardine (1988a). Following Rodriguez (1980), it is likely that public consumption expenditures are strongly biased toward home goods, and the excess demand for them is only eliminated through a fall in RER. As O'Mara et al. conclude "...the major role of the real exchange rate is to maintain equilibrium in the non-traded goods market in the presence of shifts in aggregate demand or absorption" (p.11). This effect would be reinforced if the government used inflationary tax financing to cover its deficits through expansion of the monetary base, the extent of which is analysed by Scobie and Jardine (1988a). The expansion in public consumption spending in the 1970s resulted in a surge in demand for construction services, and a dramatic rise in the civil service wage bill. The rising wages resulted in a fall in the RER and a fall in the incentive to produce non-petroleum tradables.

Current Account Balance (CAB)

The extended period of a deficit on the current account and its corollary, net capital inflows are expected to have reduced the real exchange rate in Ecuador, and reduce the incentives for tradable goods production. The extent to which this occurs depends crucially on the propensity to spend on tradable goods. If all the income from capital flows were spent solely on tradables there would be no effect on the real exchange rate. A government using foreign loans to buy imported defence equipment would constitute such a case. However to the extent that inflows are associated with a rise in the excess demand for home goods, then the RER can be expected to appreciate.

Monetary and Exchange Rate Policy (MONEX)

The construction of this variable follows from the demand (M^d) and supply (M2/P) for real money balances. Equilibrium in the demand for real balances requires that

$$M2 = P. M^{d}(y,i)$$
(5)

where P is the domestic price level, y is real income and i the rate of interest. By defining MONEX as the proportionate increase in the excess supply of money balances,

$$MONEX = E(M2) - \{E(P) + E(M^{d})\}$$
(6)

where E is the logarithmic differential operator such that in general EX = dInX. If we now introduce four assumptions, viz. (a) that the income elasticity of demand for money balances is unitary; (b) that the law of one price holds; (c) that the interest elasticity of demand for money balances is zero; and (d) that the economy is dominated by traded goods, then it follows that (6) can be written as

$$MONEX = E(M2) - \{E(P^{W}) + E(E_{n}) + E(y)\}$$
(7)

where P^w is a world price index, and E_n the nominal exchange rate. The variable MONEX then measures the excess rate of growth in the supply of money balances. When the Central Bank increases the monetary base at a rate such that E(M2) exceeds the second term in (7), then there will be excess supply of money and a corresponding excess demand for goods. This will create upward pressure on the supply of home goods, and the resultant excess inflation will appreciate the real exchange rate and penalise the production of agricultural and other tradable goods. Only when the growth of the money supply is matched by a combination of foreign inflation, real income growth and nominal devaluation will this tendency to appreciate the real exchange rate be eliminated.

Commercial Policy $(1 + t_m)$ and $(1-t_x)$

Commercial policies can take many different forms. Ecuador has employed a bewildering array of tariff barriers which have varied in coverage and intensity almost weekly; prior import deposits; taxes on exports; quotas or outright bans on imports; subsidies to non traditional exports and processing; special exchange payments and tax credit certificates to qualifying exporters. A detailed analysis of these policies and quantitative estimates for them is given in Keeler, Scobie and Greene (1987).

The standard analysis of the relation between tariffs and the exchange rate leads to the conclusion that the rise in the price of importables occasioned by the introduction of tariffs will lead to a surplus in the balance of payments, and a rise in demand for non-traded substitutes, both effects resulting in an appreciation of the real exchange rate. The effect of export taxes (t_x) is "...to move the exchange rate in the opposite direction, ie, they produce a real depreciation". (Cavallo and Dadone, 1986). The impact of tariffs needs closer examination when intermediate goods are introduced, and Edwards (1985) reviews the range of potential outcomes when there are three goods and two factors of production.

To the extent that increases in the price of importables are accompanied by "compensating" rises in wage levels and hence the price of home goods, then experience in other countries in Latin America suggests that there is little true protection afforded by import substituting industrialisation policies. The net effect is to act as a tax on the production of exportables, largely agricultural goods (Jardine, Scobie and Baker, 1988).

While Cavallo et al. (1986) include a single term to reflect trade policy, the present study has attempted to allow for the separate influence of t_m and t_x . The variables were constructed by dividing estimates of the effective exchange rates (Keeler, Scobie and Greene) which attempted to capture all the major elements of Ecuadorean commercial policy, by the nominal exchange rate, as, following Garcia Garcia (1981)

$$E_{e} = E_{n} (1 + t_{m1} + ... + t_{mM})$$
(8)

where t_{mi} , i = 1...M are the series tariff equivalents of each of the policy interventions altering the domestic relative price of importables. A similar expression applies to exportables.

The second relationship in the model is given by

$$Z_{ag}/Z_{nt} = g(RER) \tag{9}$$

where Z_{ag} and Z_{nt} are the values added in agriculture and the non-traded sector of the economy. Details of the disaggregation of the national accounts for constructing this variable are given in Scobie and Jardine (1988b).

The implications of equation (9) can be depicted graphically. In Figure 2, the production possibilities frontier is given by ZZ and describes the possible combinations of Z_{ag} and Z_{nt} that can be produced. At an initial real exchange rate of RER₀ the production point is at B (A₀,N₀). If as a result of changes in the policies outlined above the real exchange rate were to rise to RER₁ then the equilibrium production point would move to the point C (A₁,N₁). Equation (9) describes the way in which the slope of the ray from the origin (OB or OC) changes in response to movements in the RER induced by macroeconomic policies.

As shown in Figure 2, the economy is always producing on the frontier ZZ. However if policies distort key domestic relative prices, it may well be that the economy is actually at some point such as E inside the frontier. Furthermore, with liberalisation that raises RER the incentives for investment may be enhanced. Policies which have castigated the agricultural sector will have reduced the incentive for capital formation, and for the generation and adoption of new techni-

ques for enhancing productivity. As a result, a sustained improvement in the intersectoral terms of trade will result in both a shift around the frontier, and a an expansion of the frontier so that in effect the production point moves from E to a point such as F. In this study we focus on the shifts around the frontier as represented by the change in the slope of the ray from the origin.



Figure 2 : Intersectoral Output and the Real Exchange Rate

5. THE RESULTS

The estimation involves fitting equations (4) and (9) by least squares. As these two equations form a recursive system, the application of OLS to each equation generates estimates that are consistent and asymptotically efficient. This result follows provided that the disturbance terms are not correlated. To allow for this possibility, the equations were estimated using 2SLS. As the results were virtually identical, the OLS estimates are presented here. The estimated equations (with t values in parentheses) are as follows:

Dependent Variable: InRER R Squared = 0.65

Independent Variables, Estimated Parameters (t values)

Constant -0.486 (-3.92)

InTOT -0.271 (-2.04)

InCG -0.363 (-1.68)

CAB 0.031 (2.74)

MONEX -0.005 (-2.15)

 $ln(1 + t_m) -0.851 (-2.12)$

ln(1-t_x) -0.606 (-1.07)

Dependent Variable: $ln(Z_{aq}/Z_{nt})$ R Squared = 0.76

Independent Variables, Estimated Parameters (t values)

Constant -0.908 (-5.34)

InRER 1.645 (8.90)

In both equations, the independent variables have the expected sign and are statistically significant, with the exception of the export taxes. The actual and predicted values of the dependent variables are given in Tables 7 and 8, and shown graphically in Figures 3 and 4. These figures serve to highlight the dramatic fall in both the real exchange rate and the relative output of agriculture throughout the 1970's, and the recovery since the policy changes initiated in 1981.

Figure 3 : Real Exchange Rate Actual and Simulated

Figure 4 : Relative Output of Agriculture Tradables to Home Goods



6. POLICY SIMULATIONS

This section explores the path of the real exchange rate, and through it the relative output of agriculture, that would have prevailed had the policy mix been different. The policies that are considered are government consumption (CG), the current account balance (CAB), the rate of monetary growth (M2), and commercial policy.

The simulated values of each of these independent variables are given in Table 1. In general the values were changed starting in 1970, and set at levels that were typical of the preceding decade. The rate of expansion of the nominal money supply (M2) was set at 12.2 percent annually, based on the period 1960 to 1970. This rate of growth contrasts with an actual annual average rate between 1971 and 1986 of 22.2 percent. In the case of the trade interventions, it was assumed that free trade would prevail from 1970 implying a complete removal of all trade distortions.

The impact of each of the policies was simulated in turn, and finally all were simultaneously imposed. For convenience this latter strategy is denoted as a "stable macroeconomic policy", and for brevity only those results are included here. The results of the simulations for the real exchange rate are given in Figure 5. The corresponding estimates of the relative output of agriculture (Z_{ag}/Z_{nt}) are shown in Figure 6. The simulated and estimated values of relative output are computed by using the predicted values of the real exchange rate from the first equation.

A summary of the simulation results is given Table 2 which shows the values of the ratio Z_{ag}/Z_{nt} for selected periods, under the various policy simulations. Figure 7 summarises the ratio under the stable macroeconomic policy strategy, and shows that in contrast to the marked decline in the actual relative output of agriculture, the relative position could have been maintained had the economic policies not lead to a significant worsening in the terms of trade facing the sector.

The predicted and simulated values of real absolute agricultural GDP are given in Table 3. The predicted values are those from equation (9) found by inserting the predicted value of RER from (4). The simulated values were computed on the basis of applying all the simulated policy changes. The predicted output grew at an annual rate of 0.15 percent. On the other hand, real agricultural growth between 1970 and 1986 could have been over 5 percent annually, had a more stable set of macroeconomic policies prevailed. Agriculture's share of total GDP, while still showing some decline would have remained at a very much higher level.



Figure 5 : Real Exchange Rate With Stable Macroeconomic Policies

Figure 6 : Relative Output of Agriculture (Zag/Znt) With Stable Macroeconomic Policies



Figure 7 : Predicted and Simulated Relative Performance of Agriculture (Zag/Znt)



7. FURTHER TRADE POLICY SIMULATIONS

Of particular note is the severely depressing effect of trade policy (Table 2). Trade liberalisation would have resulted in a major absolute increase in real agricultural GDP. Because of the apparent importance of trade policy, further simulations were carried out. These were based on a steady phasing out of trade interventions over the period 1970 to 1986. Each year the import protection and export taxes were successively reduced so that by 1986 free trade prevailed.

With this pattern of trade liberalisation, the simulated value of the real exchange rate was computed, using the actual values of other independent variables. These values were then used to simulate the relative value added in agriculture, and compared with the predicted values from the estimating equations (Table 4). With this pattern of phased reduction in trade interventions, agricultural GDP would have increased almost threefold relative to value added in home goods, compared to the levels which actually prevailed.

The extent to which the import protection policies pursued by Latin American countries represents a tax on their agricultural sectors has been a topic that has received considerable attention, both theoretically and empirically (Sjaastad, 1980; Clements and Sjaastad, 1984). The present model can be used to throw some further light on this question for the case of Ecuador. The following question was posed: given the various macroeconomic policies that were pursued, what would the level of the import protection had to have been in order for the relative output of the agricultural sector to have been maintained?

The first step was to estimate the average value for 1960-69 of Z_{ag}/Z_{nt} . This was found to be 0.587. The second step is to use the estimate of equation (9) to calculate the value of the real exchange rate which would have sustained this relative output for the agricultural sector. This was found to be 1.26 (or InRER = 0.228). The estimated form of equation (4) can now be solved for the value of t_m that would have been needed if the relative position of the sector were to have been sustained at the level prevailing in the 1960s. The results are shown in Figure 8.



Figure 8: Import Protection and Agriculture - Actual and Implied 3 Year Moving Average of t_m

As is clearly evident, the level of protection to importables would have had to have been negative, not positive and increasing over time. In other words, rather than an increasing level of positive protection, importables would have had to have been taxed (through subsidies to imports), rather than protected, in order for there to have been a neutral policy environment for the agricultural sector. The need for this was lessened in the years after 1981 as other policy elements became less discriminatory. But the conclusion is clear; agriculture, already burdened with other policies which discriminated against it, was further taxed by a policy of protecting importables, at the very time when reduced protection would have been called for.

8. CONCLUDING OBSERVATIONS

This paper has examined the influence of macroeconomic policy on the agricultural sector in Ecuador. The central variable has been the real exchange rate which represents the relative profitability of producing traded goods. As the agricultural sector comprises largely of traded goods it is highly susceptible to changes in this rate. The impact of fiscal, monetary exchange rate and commercial policies for the exchange rate was analysed. The relation between these exchange rate movements and the relative output of the agricultural sector formed the second step in a simple model. Through their influence on the real exchange rate, these macroeconomic variables were shown to explain much of the decline in the relative output of agriculture that occurred between 1971 and 1981.

Had the macroeconomic management been such as to avoid the sharp reduction in incentives to production facing the sector, real growth could have exceeded 5 percent annually between 1970 and 1986. Real output in 1986 would have been almost three times what was actually achieved. These estimates are conservative in the sense that they reflect responses to relative price movements around a given production possibility frontier. It is highly probable that a different structure of incentives involving less distortions would have had dynamic effects and lead to greater investment in productive capacity. The impact on investment has not been explored here.

This study has focussed on the domestic policy elements, on the grounds that there is much that Ecuador can do to influence the relative sectoral incentives quite apart from changes in external circumstances. The marked discriminatory effect of commercial policy on agriculture demonstrated by the results in this study surely constitutes strong support for the proposition that domestic policy actions have a direct bearing on the performance of the sector.

However this in no way precludes the importance of world market conditions in altering the incentives for Ecuadorean agriculture, nor the role that the country should play in multilateral fora to seek the reduction of distortions to world agricultural trade imposed largely by the industrialised countries.

One of the major policy issues facing Ecuador is the management of unanticipated shocks to its economy. These come from a range of sources including natural and climatic phenomena, and changes in world commodity prices. For example, had the relatively short lived nature of the petroleum boom been envisaged in 1973, the country may have adopted a more judicious approach to burgeoning public consumption and foreign borrowing, such that key economic signals did not discriminate so strongly against the agricultural sector. This is not necessarily to imply the need for public policy intervention; there would be serious misgivings about the ability of bureaucrats to out perform private economic agents in their management of instability. It does suggest however that the public policy environment should be such as to give the economy the greatest degree of flexibility possible in order to adjust to these shocks. In addition to having implications for economic efficiency and equity, the country's economic development strategy conditions the range and magnitude of responses to variability. High dependence on imported raw materials, high levels of foreign debt, subsidies to imported food, fixed interest and exchange rates, controls on capital movements, and a reliance on petroleum taxation for a large part of public revenues are policies which have probably limited the economy's ability to respond to shocks. The extent to which this has added further to the disincentives for the tradable sector and agriculture specifically, remains an important item on the research agenda.

TABLE	1	:	SIMULATED	VALUES	0F	INDEPENDENT	VARIABLES
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YEAR	GOVERNMENT	CURRENT	MONEY SUPPLY	TRADE TAXES		
1		BALANCE		IMPORTS	EXPORTS	
	(CG/Y)	(CAB/Y)	(M2)	(1+tm)	(1-tx)	
1060	12 01	 2 /0	2 20	1 27	1 00	
1900		-2.40	2.20	1.3/ 1.2/		
1901		-3.45	2.00	1 1 2 2	1.00	
1 1062	13.35	-1.00	2,00	1 1 20	1 00	
1905	12.79	-1.45	2.00	1 1 20	1.00	
1 1065		-5.26	3 20	1 1 34	0.88	
1 1966	8 59	-4 52	3.85	1 1 42	0.89	
1 1967	8.16	-5.67	4.46	1.43	0.90	
1968	9,30	-7.48	5.56	1.43	0.91	
1969	10.32	-7.76	6.30	1.43	0.89	
1970	11.02	-6.45	7.74	1.00	1.00	
1 1971	11.00	-4.50	8.68	1.00	1.00	
1972	11.00	-4.50	9.74	1.00	1.00	
1973	11.00	-4.50	10.94	1.00	1.00	
1974	11.00	-4.50	12.28	1.00	1.00	
1975	11.00	-4.50	13.78	1.00	1.00	
1976	11.00	-4.50	15.46	1.00	1.00	
1977	11.00	-4.50	17.36	1.00	1.00	
1978	11.00	-4.50	19.48	1.00	1.00	
1979	11.00	-4.50	21.86	1.00	1.00	
1980	11.00	-4.50	24.54	1.00	1.00	
1981	11.00	-4.50	27.54	1.00	1.00	
1982	11.00	-4.50	30.92	1.00	1.00	
1983	11.00	-4.50	34.70	1.00	1.00	
1984	11.00	-4.50	38.95	1.00	1.00	
1985	11.00	-4.50	43.71	1.00	1.00	
1986	11.00	-4.50	49.06			

TABLE 2 : SUMMARY OF THE RELATIVE PERFORMANCE OF AGRICULTURE UNDER SIMULATED POLICIES (Zag/Znt)

YEAR	PREDICTED USING	SIMULATED POLICIES					
	EXCHANGE RATE	GOVERNMENT CONSUMPTION	CURRENT ACCOUNT I	EXCESS MONEY SUPPLY	TRADE POLICY	ALL POLICIES	
			PRIOR TO TH	HE SIMILATION			
1960 - 69	0.41	0.41	0.41	0.41	0.41	0.41	
			FOLLOWING	THE SIMILATION	N		
1970 - 75	0.41	0.42	0.45	0.46	0.55	0.66	
1975 - 81	0.36	0.42	0.39	0.39	0.48	0.64	
1982 - 86	0.23	0.24	0.23	0.27	0.54	0.68	
	0.34	0.37	0.36	0.38	0.53	0.66	

TABLE 3 : ESTIMATED GROWTH OF PREDICTED AND SIMULATED REAL GROSS DOMESTIC PRODUCT IN AGRICULTURE

	PREDICTED VALUE	SIMULATED VALUE		
YEAR	(Zagʻ)	(Zag SIM ALL)		
	MILLIONS OF 1	975 SUCRES		
1970	20839	27951		
1971	20871	29433		
1972	20903	30994		
1973	20935	32638		
1974	20968	34368		
1975	21000	36191		
1976	21033	38110		
1977	21065	40130		
1978	21098	42258		
1979	21131	44499		
1980	21163	46859		
1981	21196	49343		
1982	21229	51960		
1983	21262	54715		
1984	21295	57616		
1985	21328	60671		
1986	21361	63888		
ANNUAL				
AVERAGE	0.15% p.a.	5.17% p.a.		
GROWTH RATE		ļ		

		RELATIVE OUTPUT (Zag/Znt)				
YEAR	 SIMULATED REAL EXCHANGE RATE 	USING PREDICTED REAL EXCHANGE RATE	USING SIMULATED REAL EXCHANGE RATE	RATIO SIMULATED : PREDICTED 1975 = 100		
1960	1.02	0.42	0.42	99.8		
1961	1.07	0.45	0.45	99.8		
1962	0.96	0.38	0.38	99.8		
1963	0.95	0.37	0.37	99.8		
1964	0.96	0.37	0.37	99.8		
1965	1.16	0.51	0.51	99.8		
1966	1.07	0.45	0.45	99.8		
1967	1.04	0.43	0.43	99.8		
1968	0.87	0.32	0.32	99.8		
1969	0.93	0.36	0.36	99.8		
1970	1.03	0.45	0.42	93.8		
1971	0.92	0.42	0.35	82.4		
1972	0.98	0.39	0.39	99.7		
1973	1.20	0.50	0.55	108.9		
1974	1.01	0.41	0.41	98.6		
1975	0.84	0.30	0.30	100.0		
1976	1.02	0.39	0.41	105.8		
1977	1.08	0.39	0.46			
1978	1.04	0.39	0.43			
1979	1.14	0.44	0.50	113.9		
1980	0.93	0.32				
1981	0.95	0.30	0.3/			
1 1002	U-85	0.20	0.31	104.0 206.0		
1084	1.24	0.20	0.50	240.5		
1085	1 1 21	0.24	0.57	269.6		
1086	1.51	0.23		275 7		
1300	1.15	0.10	0.49	2/3-/		

TABLE 4 : REAL EXCHANGE RATE AND RELATIVE GROSS DOMESTIC PRODUCT OF AGRICULTURE UNDER PHASED REDUCTION OF TRADE INTERVENTIONS

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THE NEW ZEALAND LIVE SHEEP EXPORT QUOTA: THE POTENTIAL IMPACT AND ECONOMIC CONSIDERATIONS

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ABSTRACT

The export of live sheep which recommenced in 1985 has seen only a modest growth mainly due to the annual quota in effect since 1986. This paper examines the issues associated with the live sheep trade and discusses the implications to New Zealand of the quota.

In the longterm, the benefits to the economy of unrestricted trade are considered to outweigh any short-term losses to sector groups. The main effects of the live sheep trade on sheep farming are on current returns and future sheep numbers. The effects on the meat processing industry have to be viewed both in the short-term and the longterm, with the recognition of the need for restructuring independent of the live sheep trade.

The live sheep trade from New Zealand is at a crossroads and the upcoming years are critical in determining the future growth and the prospects for the development of markets. The absence of a sound economic basis for determining the quota and its allocation has stifled the natural growth in this trade. The continuation of the quota system would hamper future trade and deprive New Zealand sheep farmers a much needed additional market outlet.

Key Words: Live sheep, slaughter, substitution, Middle East.

* The helpful suggestions and the critical comments of Ron Sandrey and Catherine Petrey are gratefully acknowledged. Special thanks to Russ Reynolds for his valuable assistance in facilitating an enhanced presentation of the issues. The remaining errors and the views expressed are those of the author and is not attributable to the Ministry of Agriculture and Fisheries.

NEW ZEALAND LIVE SHEEP EXPORT QUOTA: THE POTENTIAL IMPACT AND ECONOMIC CONSIDERATIONS

1 INTRODUCTION

The export of live sheep from New Zealand for slaughter overseas (as distinct from stock for breeding purposes) recommenced in 1985 after several years of total ban. The trade is currently monitored by the Live Sheep Export Advisory Committee (LSEAC) established by the Government in 1986. This committee was set up as a political solution to potential industrial relations difficulties and to satisfy animal welfare concerns while recognising that there would be some loss of employment in the slaughter industry, regardless of the developments in the live animal trade. The annual quotas set over the last three seasons and other activities of the Committee since its establishment have been under review by the government, and its term was recently extended to 30 September 1988.

The brief by the Government for the LSEAC was to set annual quotas for the number of sheep allowed to be exported live based on annual lambing percentages and the stated needs of the meat processing industry, but with some consideration to the returns and income levels of sheep farmers. LSEAC is a 5 person committee, made up of two representatives from the Combined Trade Union (CTU), one member each representing the Live Stock Exporters Association (LEA) and the sheep farmers through the Federated Farmers, and a former Cabinet Minister as an independent Chairman. The committee functions solely in an advisory capacity to the Minister of Customs and its decisions are not legally binding.

The objectives of this paper are to provide a conceptual framework for analysis, to highlight and to look at the important issues in the implementation of quotas, and to present available data. Where relevant New Zealand information is limited, it has been supplemented with some observations on the Australian evidence while recognising the main differences in the sheep industries of the two countries.

In Australia, the live sheep trade has been in operation for over 25 years, but assumed significant levels only during the last 10 years. The expansion of the trade offered Australian sheep farmers an additional marketing outlet and enhanced the viability of the total sheep enterprise. It is also noteworthy that in the period 1976 to 1984 in Australia, there were attempts to limit the growth of the trade or tax to compensate for short-term loss of employment in the Australian slaughter industry. These developments have a number of parallels with the current New Zealand situation. Against this background, this study has found it most useful to draw upon analysis by the Bureau of Agricultural Economics (BAE) based on a longterm dynamic framework which evaluated the impact of the live sheep trade on the size and structure of the sheep flock, returns to sheep farmers and the domestic slaughtering and employment levels within Australia.

Several factors contribute to making 1988 a particularly relevant time to focus on the economic implications of the live sheep export quotas. First, the LSEAC is under review by the Government and the committee's current term expires at the end of September. Second, the first half of 1988 has seen heightened demand for New Zealand sheep from Saudi Arabian buyers in response to those buyers inability to source sufficient suitable stock from Australia. Actions by Australian producers to hold more merino wethers on farms in response to the very high wool returns has been an important factor. This has led to the opening of a 'window of opportunity' for New Zealand to cement a position as a major supplier to the key Saudi market. Finally, the continuing poor returns being experienced by New Zealand sheep farmers, together with industry cost pressures associated with the high value of the New Zealand dollar, has led to sheep farmer net income levels which are insufficient to sustain sheep numbers. This additional demand for sheep by way of live animals sold at higher prices will be one factor which would keep more sheep enterprises viable and arrest the fall in national sheep numbers.

The structure of the paper is to first survey the background to the live export trade, and to identify principal market demand characteristics, alternate supplies of meat and suppliers of live sheep. This market analysis provides the framework against which the effects of the live sheep exports on producer returns and hence on the sheep industry is analysed. Following this the effects on the meat processing industries are examined. Animal welfare, transport considerations, and recent market developments are analysed leading up to a study of implications of the quota and of its administration.

2 BACKGROUND AND MARKET CHARACTERISTICS

The main task in this section of the paper is to identify and discuss the major determinants of demand for live sheep, especially in the Middle East market. For purposes of this study the Middle East is defined to include those countries surrounding the Persian Gulf (including Iran and Iraq) and some countries of North Africa such as Algeria, Libya and Egypt. The nature of demand for sheepmeat in the Middle East, both frozen and chilled lamb and mutton is also considered. This takes account of some of the supply adjustments anticipated in these countries in response to domestic government programmes and policies. Observations on the Middle East markets for live sheep and sheepmeat are drawn principally from the study by Hyde et al (1983) incorporated in the BAE occasional paper.

2.1 Characteristics of Demand in Middle East Markets

The Middle Eastern countries are far from being a homogeneous market for meat. This is due to the marked difference between countries in per capita wealth and the proportion of the expatriate population. Saudi Arabia and Kuwait are at the top end of the income level in the region, with Yemen and Iran at the lower end. In UAE and Kuwait the expatriates make up about 60 percent of the population, while in Saudi Arabia, Bahrain, Oman and Qatar they are about 20 percent (Hyde et al, 1983).

Revenue from oil exports is the major determinant of demand in the Middle East for live sheep as well as other meat types and forms. Supplies of frozen meat is primarily from imports, while the more than 12 million sheep imported live supplement slaughter from local flocks. Another important factor is the composition of the population in the different Middle Eastern countries, comprising of the indigenous Arabs and the white collar and blue collar expatriate workers. The tourist hotel trade in some of these countries is also important. Declining income from oil together with reduced expatriate workers have resulted in some decrease in sheepmeat and live sheep imports by some Middle East countries such as Iran. The completion of some development projects is likely to reduce the demand for frozen products further as the expatriates were the main consumers of frozen meat.

The largest group of consumers consists of the indigenous Arabs among whom traditions and religious beliefs have a major influence on meat preferences and consumption patterns. It is generally customary for affluent families to purchase sheep live, for Halal slaughter and consumption on the same day, or buy mostly fresh sheepmeat from local butcher shops. During the annual pilgrimage to Mecca (Haj) taking place in June-July, there is an increased demand for entire male lambs (with tails) for sacrificial slaughter. This has been partially met by live sheep exports from New Zealand to Saudi Arabia since 1986.

Of greater significance for Australian live sheep exporters to date has been the increased demand for live sheep for consumption as part of the festivities marking the end of daily Ramadan fast during May. For this purpose, the most preferred sheep are the 'fat tailed' Arabian sheep sourced from local flocks, or imported live from North Africa or Eastern European countries. The Australian live sheep are the least preferred of the imported live sheep (Hyde et al, 1983). This is due to live sheep from Australia being predominantly older wethers and is reflected in the recent ban by Saudi Arabia on imports of sheep over two years of age. New Zealand on the other hand, exports younger animals which are likely to be more popular and more competitive with the higher priced Arabian sheep, especially around Ramadan.

The indigenous Arabs also consume significant quantities of chicken, fish and beef and increasingly fresh and frozen poultry, mainly due to its lower price. Local poultry production has more than doubled as a result of production assistance from Government support programmes, and about 60 percent of the total meat imports into the region are poultry meat. Sheepmeat and beef evenly share the balance of trade (Hyde et al, 1983). Ignoring the price effects, red meat preferences are for fresh sheepmeat followed by chilled lamb or beef. Frozen red meat is generally least preferred.

Government policies in a number of countries in the Middle East have had an effect on consumption patterns, mainly through their impact on import domestic price differentials. Ceilings on prices of imported sheep are the rule rather than exception, while there are very few controls on prices of the domestic product (Hyde et al, 1983). Imported prices are generally kept down through the use of extensive subsidies, applying mainly on imported live sheep or, in some countries, air freighted chilled meat. Subsidies on live animals increase the demand for imported live animals over imported frozen meat. In some cases, fresh meat from imported sheep is less expensive than the chilled or frozen product, even though the real cost of fresh meat from live sheep imports is much higher than both imported chilled and frozen mutton (DPI, 1982). The import of livestock and the meat trade itself is also influenced directly by the Governments in countries such as Libya and Iran where the Government agencies carry out the trading. In other countries private trade is allowed but usually under substantial Government scrutiny.

2.2 Substitutability Between Live Sheep and Sheepmeat in the Middle East

Findings of both the BAE (1983) and the DPI (1982) of Australia suggest that frozen mutton or frozen lamb are not close substitutes for the meat from live sheep in the Middle East. The reasons given for this conclusion were,

- (a) the alternative supplies of livesheep and goats available in the Middle East from such countries as Turkey, Romania, Somalia and Hungary,
- (b) the increasing market share of poultry meat,
- (c) the natural preference rankings of the indigenous population for fresh meat from live sheep over chilled meat and then frozen meat, and
- (d) the associated price effects generally induced by the government policies of Middle East countries.

The same conclusions and reasons are likely to be relevant to the corresponding products from New Zealand, even though lamb is the main form of sheepmeat exported and the live sheep trade consists of somewhat "younger" animals.

The price elasticity of demand for fresh sheepmeat in the Near East and East African region has been estimated to be - 1.4 by a joint FAO/World Bank Study (1977). From the demand characteristics identified it is possible to conclude that the elasticity of demand for frozen mutton and lamb is likely to be greater, while the estimate for live sheep is likely to be somewhat less.

A number of implications for New Zealand exports follow directly from the above discussion. First, the feasibility of New Zealand expanding exports of frozen sheepmeat, without impacting to adversely on prices received, is likely to be much greater than for exports of live sheep. Second, the preference for chilled over frozen sheepmeat is an area which seems to have some potential for New Zealand lamb exports, but marketing will need to be directed to those areas where Middle East Governments' domestic meat market pricing policies are favourable to chilled meats. Third, limiting the shipments of live sheep will not add to the demand for New Zealand frozen lamb or mutton.

2.3 Australia as the Major Competitive Supplier

The main buyer of New Zealand live lambs in the Middle East is Saudi Arabia with some purchases made by Algeria and Oman (table 1). The Australian trade in the Middle East is far more diversified, partly due to their longer term involvement in the sale of live sheep in the region. They usually sell into around ten different countries each year (table 2), with the main buyers being Kuwait, Saudi Arabia, Libya, United Arab Emirates and, up to 1981, Iran. The major growth in Australian live sheep trade was experienced in the 1970s with the expansion of the Middle East demand in line with the growth in oil revenues. The growth rate in the 8 years from 1975 to 1983 was around 722,000 head per year. Since 1983 the levels of Australian live exports have been static.

Initially, the growth in the Australian live sheep trade was based on the apparent comparative advantage Australia had due to an abundant supply of older wethers and the relative proximity of its western ports to the Middle East markets in terms of shipping cost and duration. In recent years however, the Middle East buyers have become increasingly more particular about the type of animals demanded. A major factor which has already affected demand for Australian live sheep in some of the traditional markets is discontent over the quality of Australian live sheep offered (AMLC, 1988). This is reflected in the recent ban by the Saudi Arabian government on the importation of wethers older than two years starting from August 1988. While younger and leaner lambs are more in demand, the Australian animal type available most readily for the live sheep trade are the older animals sold after several shearings of their main product-wool. The requirement for younger sheep thus makes the live sheep export business more competitive rather than complementary to the wool enterprise.

2.4 Recent Market Developments and Outlook

The immediate outlook for live sheep trade to the Middle East from New Zealand appears to be encouraging. This outlook has been helped by the shortage of supplies in Australia and by the import ban by Saudi Arabia of sheep over two years of age. The market potential in Saudi Arabia particularly and the Middle East in general for young sheep and lambs is quite considerable. However, the current levels of live sheep exports from Australia to Saudi Arabia is about 3 million head and additional live imports are sourced from Eastern European and North African suppliers. This indicates that a major portion of this market will be captured by an alternative supplier if New Zealand is unable to expand its trade due to the limitations of the quota.

To date in 1988, 1.1 million male sheep have been contracted to be shipped to Saudi Arabia from New Zealand and some 600,000 of these represent a transfer of market share from Australia. This new market is particularly attractive to the New Zealand hill country sheep farmers in the North Island, since there is no requirement for long tails as in the Haj contract for religious slaughter.

The North American market is a developing one for New Zealand, although only one shipment of about 10,000 lambs has yet been completed from the total of 240,000 projected as likely sales to North America this year. The pre- and post-shipment quarantine period and health certificates required by the USDA suggest that there will be some dleays before the next shipment of the proposed 240,000 contract is resumed.

The demand is mostly from Western United States, for young lambs to be fattened on grains. This is to compensate for a shortage of local stock which are being withheld from market to build up the breeding flock. If initial obstacles are overcome satisfactorily and the demand remains strong, the North American market for live sheep could develop to be a significant secondary outlet for New Zealand. Besides strong opposition from the small sheep industry in the US, there appear to be some objections to the trade from the New Zealand meat companies involved in the development of the chilled meat trade in North America. Although the sheep fattened on grains are consumed within the North American region, the implications of this for frozen and chilled sheepmeat and beef exports from New Zealand are unlikely to be adverse. Grainfed sheepmeat is not considered a close substitute for frozen or chilled products.

3 EFFECTS OF LIVE EXPORTS ON THE SHEEP INDUSTRY

The sheep industry is typified by complex interactions in both the production and marketing chains of its joint outputs. Sheep farmers adjust to meet changing circumstances in all these markets, dependent upon the returns received from the alternative enterprises and factors such as weather while being limited by the lagged effects of decisions made in previous periods (Grundy,Lattimore and Zwart, 1988).

Current farmer returns for sheep meats are low, but higher prices for wool, pelts and skins are compensating to some extent. Prices offered to sheep farmers by the live sheep exporters at the beginning of the 1987/88 season (\$23.50 per head) were lower than many producer expectations, due to higher schedule prices offered then, but compare very favourably with current (May-June 1988) schedule prices (\$16-19 per head) for comparable weight and grade animals.

The New Zealand sheepmeat market generally exhibits a cost plus nature on the buying side (Pappas, Carter, Evans and Koop, 1985). The producers' bargaining strength appears to be minimal and they act as price takers. The availability of alternative marketing outlets in the form of an extra final demand would likely result in greater returns to the sheep farmers, and exert additional pressure on the meat industry for restructuring. It is for this reason that the export of live sheep is viewed as an important additional market outlet with the potential to arrest further drop in sheep farm incomes.

In Australia, the competitive relationship in the saleyards provides some evidence of more contestability (competition) on the purchasing side of the sheep market. The comparable prices offered in Australia for 16-20 kg lamb for domestic slaughter are in the range of NZ\$35-45, while the live animal trade currently pays on average about NZ\$28-30 for older wethers (AMLC, 1988). The exports of live sheep also influences the structure and growth rate of the national sheep flock. Sheep numbers in New Zealand have declined for four consecutive years since the 1982/83 season, when they were at an all time high of 70.3 million. The 8-9 percent decline to 64.2 million in 1986/87 occurred over four seasons (table 3) as a supply response to low returns in sheep farming. A rise in relative returns to sheep will lead to a growth in flock size independent of whether the rise is derived from improved meat, skins, live sheep or wool prices.

The average weight of lambs required for exports as live animals (33-35 kg) is somewhat higher than for usual slaughter purposes (26-28 kg) in New Zealand. This means additional autumn feeding and pre-conditioning on grains will be required before shipment. For comparison, the Australian live sheep exports consist mainly of Merino Wethers with an average weight of 55 kg and ram lambs weighing between 33-45 kg (AMLC, 1988).

The proportion of breeding ewes in the sheep flock will differ depending upon whether the stimulus for flock expansion is derived from meat or wool prices, and will also change from year to year in response to seasonal pasture availability determined by weather conditions (Wallace and Evans, 1985). Similar relationships were observed in Australia. The Australian national sheep flock dropped from the all time high of 180 million in 1970 to 145 million in 1974 (table 4), mainly due to a substantial drop in wool prices and recurrent droughts in 1972 and 1973. Sheep numbers declined further to around 135 million and remained stable during the period 1977-1983, when the live sheep trade assumed a level of significant proportions. Since 1983 the sheep numbers in Australia have risen in response to better wool returns and reached 159 million in 1987.

There has been little indication in Australia to suggest that the live sheep trade had any significant impact on productivity parameters in the sheep industry such as lambing percentages, death rates, slaughter weights and wool clip per animal (Reeves et al, 1983). Increases in prices and profitability of sheep raising can lead to improvement in the level of management and/or increases in numbers, but this is often offset by increased vulnerability to seasonal conditions. Nevertheless, the live sheep export effect has been overwhelmed by the wool price effects and losses brought about by droughts.

4 EFFECTS OF TRADE ON THE MEAT PROCESSING INDUSTRY

It needs to be acknowledged that the live sheep trade does have a detrimental effect on domestic sheep slaughter and consequently employment levels in the meat processing industry. The extent of this effect will be examined in this section in relation to the effects in the short term (or immediate effects) and the long term (dynamic effects). The live export trade also needs to be viewed in the context of overall benefits to the economy, taking into account the effects on all the participants of the trade. It is also necessary to recognise the current levels of over-capacity and under-utilisation of plants in the processing industry and the need for urgent restructuring for increased efficiency, independent of the live sheep trade. Total domestic sheep and lamb slaughter in New Zealand (table 3) rose significantly from about 32 million in the mid 1970's to almost 51 million in 1985, before declining to around 41 million in 1987. This reflects the structural changes and growth in the industry due to the build up of sheep numbers in the early 1980s in response to government incentives, and subsequent elimination of assistance to sheep production since the 1984/85 season.

The corresponding Australian figures for the period 1974-1987 (table 4) indicate that total sheep and lamb slaughterings fluctuated between about 25 million and 32 million. While lamb slaughter increased steadily from 14 to 18 million, adult sheep slaughter had been volatile during this period. Slaughtering generally rises during drought years and declines during good seasons. As a result of the growth in the Australian live sheep trade, the percentage of animals exported live grew to a level equivalent to 20 percent of total Australian sheep slaughtered at home and abroad. In comparison the exports of live sheep from New Zealand is currently less than 2 percent of the total sheep and lamb slaughter.

The employment implications in the meat processing sector due to the live sheep trade has been a sensitive issue in both Australia and New Zealand. In Australia, it has generally been acknowledged that the live sheep trade has created extra jobs in some areas while resulting in loss of jobs in others (Miller, 1978). Some of the employment implications are quite direct and visible, but others are more indirect. Loss of jobs in the processing sector are quite clearly observed, but the creation of employment in the overall sheep production, exports and allied industries are not so visible. They are nevertheless as important and real as those in the readily observable areas of the industry, and have to be considered for a balanced assessment.

The Australian experience so far suggest medium to long-term benefits for sheep farming due to the live sheep trade. Their sheep flock build up as a response to this increased profitability, is often obscured by adverse weather conditions as well as fluctuations in wool prices. The associated employment creation and stability both in the meat processing and live sheep trading activities somewhat balanced short-term job losses on a localised or regional basis. Annual variations in domestic slaughter of lambs and adult sheep, even in the absence of live sheep trade, remain a characteristic factor.

In New Zealand, the export meat industry shows evidence of serious competitive weakness. A comparison of sheepmeat processing costs on a per capita GDP basis, adjusted for international comparisons, found costs in the New Zealand processing industry to be twice as much as those in the US and UK and about 20 percent higher than in Australia (Pappas, Carter, Evans and Koop, 1985). Processing costs in the New Zealand meat industry are adversely affected by low plant utilisation levels determined by the length of the killing season, the number of operating hours per week during the season, and the tally.

A major factor affecting unit costs is slaughterboard capacity utilisation, which on average was only 10 percent over the 46 plants in operation in New Zealand during 1983/84. While plants in Australia, US and Europe typically operate for over 230 days per slaughtering year, the average killing season in New Zealand is only 160 days. Slaughtering hours per week during the peak periods of the season is also lower in New Zealand (40 hours) compared to the US (50 hours) and UK (60 hours).

There are also wide variations in seasonality among the New Zealand plants. An important issue in this regard is the effect of the live sheep trade on the distinctly seasonal nature of domestic sheep slaughterings. The heavy killing months in New Zealand are from December to April or May, while the demand for religious slaughter in the Middle East is during June-July requiring animals to be shipped in May or June. The implications of this for seasonality are inconclusive, but the lambs which may be shipped in May are likely to be slaughtered earlier in February or March under the present system. Thus by reducing the peak processing capacity requirement in New Zealand, the seasonality will to some extent be reduced by the live sheep trade.

The rationale for the live sheep export quota pertaining to potential loss of employment in the meat processing and freezing industries does little other than to divert attention away from the needed restructuring and rationalisation in this primary processing sector. While it is important to recognise the significance of the meat industry to New Zealand and provide safeguards against wide fluctuations in raw material (stock) availability, flexibility in meat processing plants has to be encouraged to enhance efficiency and productivity.

5 ANIMAL WELFARE AND TRANSPORT ISSUES

Other matters of concern relate to animal welfare considerations during the shipment of live animals and the nature of slaughter of sheep for religious purposes and customs in the Middle East region. The Society for the Prevention of Cruelty to Animals (SPCA) has expressed concern.

SPCA objections relate to the conditions the sheep must endure while being shipped to the Middle East, particularly the high levels of heat experienced in the Red Seas. This resulted in an unusually high casualty rate of 6 percent in the case of one shipment in 1987, even though the environment and the condition of the sheep on board were monitored by independent government veterinary staff and the ship's crew took every possible measure to improve air circulation. Of equal concern to this society is the method of slaughter required by religious customs, leading to additional suffering of animals in comparison to the slaughter techniques used in the sheep meat exporting countries.

These concerns are very relevant and need to be viewed by producers and shippers as setting the minimum technical standards for the trade. Adequate remedial measures need to be adopted to correct the problems, especially in the case of conditions on the ships. They will play a continuing role in future live sheep exports from New Zealand.

The Iran-Iraq conflict is also the source of some concern due to the potential disruptions and delays in shipping through the Gulf. The

potential for exporting live animals through the Panama canal to the North African markets, most likely in enclosed ships, is currently being explored by some New Zealand exporters and is likely to lessen the mortality problems as well as the shipping delays.

6 THE LIVE EXPORT QUOTA AND ITS IMPLICATIONS

The New Zealand government has unilaterally liberalised many sectors of the economy since 1985. The agricultural sector has seen drastic cuts in assistance, and the manufacturing sector has had tariff reforms. The sheep farmers in New Zealand have thus been exposed to market realities and are now expected to respond to the world supply and demand conditions for their joint products of lamb, mutton, wool, skins and live sheep. Farmers and exporters have limited ability to take advantage of the demand for live sheep due to the restrictions imposed on trade by the annual quotas. These annual quotas are viewed by farmers and exporters as restricting the natural growth in the trade and as being inconsistent with the overall government policy of non market intervention and liberalisation of agricultural trade.

6.1 The Quota Administration is a Problem

There has been only a modest growth in exports of live sheep from New Zealand during the last three seasons when the quota was operational. It needs to be noted that the quota is set on the year ended 30 September basis and so the export figures quoted below are approximate and will not line up with the calendar year figures given in table 1. Exports totalled around 400,000 head in 1985/86 (quota was 550,000) and about 700,000 head in 1986/87, when it was well below the combined total of the annual quota and carry over of the previous year's unused quota amounting to 900,000 animals. In the 1987/88 season the quota was set at 760,000, only 10,000 more than the 1986/87 quota of 750,000, on the basis that there was a large unfilled quota in the previous season.

There have been a number of problems with quota administration. Firstly, there has been concern over allocation between suppliers and markets. Uncertainty about the availability of quota for individual exporters has been the main reason for the short falls in fulfilling the overall quotas set. The absence of a sound basis for its allocation among prospective exporters has resulted in larger established live animals exporters receiving priority in the allocation of quotas. This has meant small exporters and new entrants with firm offers have been disadvantaged, further contributing to this uncertainty. There are also no apparent guidelines in quota allocation to balance the interests of the existing New Zealand markets for live sheep in their expansion phase, with that of newly developing or widening markets. A second and probably the major criticism that can be levelled against the quotas is the absence of a sound basis for determining the size of annual quotas. The administration of quotas only complicates the inherent market uncertainty, and the quota tends to become a self-fulfilling prophecy. Restrictions in the next year are justified in large part on the basis that previous years quotas had not been filled irrespective of the fact that the quota had limited the exports.

The rationale for establishing a committee in 1986 to monitor the live sheep trade for socio-political considerations provided a forum for the parties to express their differences and resolve them. But the absence of a sound economic basis or guidelines for the committee to determine the amount of the annual quota and its allocation among exporters has led to certain amount of arbitrariness and subjectivity in the committee's decisions. This has stifled the natural growth that would have been possible without the limits of the quota, and would continue to seriously hamper the trade if it remains in place.

In summary, the operation of the live sheep export quota system inhibits the realisation of potential gains for at least two reasons. First, the opportunity of live sheep sales is made unavailable to many farmers, and secondly the nature of quota allocation reduces effective competition among exporters and thus lowers prices for the sheep farmers.

6.2 Analysis of Implications of Restrictions

Restrictions on live sheep trade have implications for current and prospective exporters of live sheep, the meat processing industry and the sheep farmers. The distribution of benefits and costs of restrictions have to be viewed from a national perspective, both in the short and medium-term. There are a number of different forms in which the trade restriction can manifest itself. In New Zealand it has taken the form of an annual quota set by the advisory committee. The nature of restrictions discussed in Australia were somewhat different. They were.

- (a) a limit on annual livesheep exports to the number of mutton carcass equivalents to be shipped in that year to specific Middle East countries (the 1:1 restriction),
- (b) taxes on live sheep exports, and/or
- (c) subsidies on mutton sales to the Middle East.

Reynolds et al, (1983) studied the effects of a complete ban on live sheep trade from Australia and the effects of the 1:1 restriction over the decade to 1980-81 using a simulation modelling framework. The annual unit returns of producers from adult sheep was estimated to decline by 30 percent over the ten year period as a result of the complete ban. The restriction limiting live sheep exports to a 1:1 basis with carcass equivalent of mutton or lamb exports resulted in an estimated loss of about \$A150 million, around 10 percent in sheep and wool sales for the same period. The estimated effects on the size of the sheep flock in the long-term analysis was a 12 million drop in sheep numbers due to the complete ban, and a 6-11 million decline due to the 1:1 ratio restriction.

The impact of the live sheep trade on the adult sheep market was captured in the economic model through the quantity effect (ie numbers of live sheep exported) and the price effect (ie increased unit returns from live sheep sales). The quantity effect accounted for three-quarters and the price effect one-quarter of the total impact. Average adult sheep prices were estimated to increase by 10 percent due to the livesheep trade, although some of this price premium was attributed to the difference in age and quality.

A crucial factor determining these results of trade restrictions is the level of substitution between live sheep and frozen and/or chilled sheepmeat demand in the Middle East market. This issue was addressed in an earlier section and the degree of substitution in the Middle East found to be very minimal. It follows from this that the arguments for diversion of sheep from live exports to domestic slaughter and exports as frozen or chilled meat in order to promote or safeguard employment in the domestic meat industry is a weak one. Such a diversion is only likely to lead to the loss of market share for total New Zealand sheep meat consumed in the Middle East and loss of revenue to sheep producers. This conclusion follows directly from the Australian research which demonstrated that restrictions would result in an increase in the price of live sheep and reduced consumption accompanied by a reduction in mutton prices, but with only a slight increase in mutton consumption (Reeves and Cornell, 1983). The consequence was a significant loss of market share in the live sheep export market, with only a small gain in the mutton market. A parallel argument can be advanced with respect to the New Zealand market share for lamb in the Middle East currently at around 35 percent, even though the market share for mutton in the Middle East is less than 5 percent (MAF/SONZA, 1988).

7 SUMMARY

Live sheep export trade for slaughter from New Zealand is in its infancy with only three years of very modest trading activity. The upcoming years are critical in determining the future growth and the prospects for the development of markets. The potential exists for New Zealand live sheep exporters to expand the current markets and capture new markets in the Middle East, North America and elsewhere. These opportunities should be viewed within an economic framework, as there are likely to be major benefits for the sheep industry and the New Zealand economy.

Sheep farming in New Zealand in the liberalised domestic economy and depressed world market environment has seen its profitability decline by upto 25 percent in real terms on an annual basis. In this context, the Government policy to restrict the live sheep trade by way of quotas established by a committee deprives sheep producers of an additional market outlet for their product as well as reducing the returns to sheep farming. It will lead to falls in both the flock numbers and the number of viable sheep producers that could be avoided to some degree.

The need for rationalisation and restructuring in the meat processing and freezing industries of New Zealand have been recognised, in order to make these industries more responsive to the changing world market conditions. The urgency for reform has come about due to reduced livestock numbers arising from depressed sheepmeat returns, the current structure of the meat industry and finally the new economic policy environment in New Zealand. The live sheep trade cannot be made an excuse for lack of progress in this

restructuring. If all potential live exports were banned and it could be assumed that all were slaughtered, it would not alleviate the need to make the adjustment needed in the slaughter sector. Restrictions lead to a negative longer term impact on slaughter stock availability through the cumulative effects of reduced producer returns on flock sizes.

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		1985			1986			1987a		
ountries	Numbers	Value ^b \$	Price ^C \$	Numbers	Value \$	Price \$	Numbers	Value \$	Price \$	
Algeria	-	-	-	-	-	-	22,000	770,000	35.00	
Mexico	18,647	766,962	41.13	17,195	591,293	34.39	-	-	-	
Oman	-	-	-	14,244	398,423	27.97	—	-	· -	
Saudi Arabia	-,	-	-	363,614	12,371,542	34.02	636,500	16,225,000	25.49	
Yearly Totals	18,647	766,962	41.13	395,053	13,361,258	33.82	658,500	16,995,000	25.81	
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Table 1: New Zealand Live Sheep Exports for Slaughter: By Destination

c Price per animal derived from the numbers and value of trade.
			('000	'animals)			
Country	1980	<u>1981</u>	1982	<u>1983</u>	<u>1984</u>	1985	1986	<u>1987</u>
Iran	1,409	715	70	0	0	0	0	0
Kuwait	1,379	1,541	1,818	1,886	2,125	1,787	1,632	1,657
Saudi Arabia	1,280	2,064	2,926	3,369	2,839	2,959	3,211	2,575
Qatar	256	271	325	372	337	392	664	440
Bahrain	201	78	107	169	276	250	188	212
S. Yemen	99	101	129	140	130	130	61	0
Libya	902	794	695	579	595	362	388	498
UAE	8	65	0	228	338	548	534	831
Other ME	0	108	168	478	133	314	320	600
Singapore	87	61	64	65	66	64	62	60
Other	1	1	1	17	1	5	12	103
Yearly Totals	5,622	5,799	6,302	7,303	6,840	6,809	7,073	6,975
Value (FOB A\$M)		168	176	183	205	204	191	203
Price (A\$Head)		29	28	25	30	30	27	27

Table 2: Australian Live Sheep Exports for Slaughter: By Destination

Source: Australian Bureau of Agricultural and Resource Economics, Commodity Statistical Bulletin (ABARE), November 1987 and personal communication.

YEAR ¹	SHEEP NOs	SLAUGH ⁻ LAMBS	TER LEVELS OF ADULT SHEEP	EXPORTS OF	TOTAL	LIVE SHEEP AS A % OF TOTAL
1974	55.9	23.0	8.7	-	31.7	-
1975	55.3	25.4	7.1	***	32.5	-
1976	56.4	25.9	6.6	-	32.5	-
1977	59.1	25.4	6.9	-	32.3	-
1978	62.2	26.4	7.7	-	34.1	-
1979	63.5	26.1	7.4	-	33.5	-
1980	68.8	28.7	7.5	-	36.2	-
1981	69.9	32.3	9.1	-	41.4	-
1982	70.3	32.1	9.0	-	41.1	-
1983	70.3	36.0	9.2		45.2	-
1984	69.7	34.7	8.9	-	43.6	-
1985	67.9	39.9	10.7	0.186	50.8	0.4
1986	67.5	34.5	6.4	0.397	41.3	0.9
1987	64.2	31.6	9.0	0.658	41.3	1.6

(Million Head)

Source: New Zealand Department of Statistics, Information Network for Official Statistics (INFOS)

1 Sheep numbers are opening stock on a June year basis (Department of Statistics) while the slaughter figures are on a September year ending basis (MAF), and the live sheep exports for slaughter are on a calendar year basis (Department of Statistics).

YEAR	SHEEP NOS	SLAUGH LAMBS	TER LEVELS OF ADULT SHEEP	EXPORTS OF	TOTAL	LIVE SHEEP AS A % OF TOTAL
1974	145	14.0	11.3	1.215	26.5	4.6
1975	152	16.0	12.7	1.524	30.2	5.0
1976	149	16.1	16.8	2.611	35.5	7.4
1977	135	15.3	16.3	4.489	36.1	12.4
1978	135	15.3	13.8	4.905	34.0	14.4
1979	134	16.0	13.6	5.244	34.8	15.1
1980	136	15.7	14.6	5.622	35.9	15.7
1981	134	16.2	12.7	5.799	34.7	16.7
1982	138	17.1	14.0	6.302	37.4	16.9
1983	133	16.8	9.7	7.303	33.8	21.6
1984	139	16.5	9.3	6.840	32.6	21.0
1985	150	18.7	11.7	6.809	37.2	18.3
1986	156	18.3	14.2	7.073	39.6	17.9
1987	159	18.0	14.0	6.975	38.8	17.5

Table 4: Distribution of Australian sheep slaughtered at home and abroad

Sources: 1 1974-1979 - Australian Live Sheep Exports, BAE occasional paper No 81. 2 1980-1987 - Commodity Statistical Bulletin, ABARE November 1987.

SINGLE MARKET DISEQUILIBRIUM MODELS: AN INTRODUCTION AND APPLICATION TO AGRICULTURAL FINANCE IN NEW ZEALAND

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SUMMARY

In most empirical market models it is assumed that period by period equilibrium holds. Although this is a fundamental assumption, equilibrium models do not often allow the assumption to be subjected to statistical hypothesis testing. In contrast, a group of models is available in which equilibrium is embodied as a testable null hypothesis. These models are so-called disequilibrium models. The purpose of this paper is to provide a brief introduction to and review of methods of construction and estimation of disequilibrium models that have been developed over the last twenty years.

By way of illustration, evidence from a disequilibrium model of the New Zealand market for trading bank loans to the agricultural sector is discussed. It is clear from the results that a model in which equilibrium was assumed could be seriously misspecified.

In conclusion it is suggested that researchers ought to carefully consider what the disequilibrium modelling literature has to offer.

Key Words: Disequilibrium, estimation, trading banks, agricultural sector.

INTRODUCTION

In most empirical market models it is assumed that period by period equilibrium holds. Models take the form

$$D_{+} = x_{+}^{\dagger} \alpha + u_{+} \ (t = 1, 2, ...T)$$
(1)

$$S_{+} = y_{+}^{1}\beta + v_{+} (t = 1, 2, ...T)$$
 (2)

and

1

$$\mathbf{D}_{\mathbf{t}} = \mathbf{S}_{\mathbf{t}} \tag{3}$$

1.

This paper is based on parts of my PhD thesis. I thank my supervisor, Tony Rayner, for encouragement and helpful advice. I also thank John Robertson for being a sympathetic listener. I remain responsible for any deficiencies in this paper. where D_t and S_t are quantities demanded and supplied in time period t; x_t^1 and y_t^1 are row vectors of observations on explanatory variables, including own price, in time period t; α and β are conformable column vectors of parameters; and u_t and v_t are serially and contemporaneously independent error terms with distributions $N(0, \sigma_u^2)$ and $N(0, \sigma_v^2)$ respectively. It is assumed that the model is identified.

Equilibrium models such as that set out above require that prices be instantaneously flexible and adjust within each time period (endogenously) to clear the market. Although equilibrium models predominate in the literature, perhaps they ought not to because they embody an *assumption* of equilibrium that cannot be statistically tested as a null *hypothesis*.

The purpose of this paper is to provide a brief introduction to and review of methods of construction and estimation of a class of single market models in which equilibrium is formulated as a testable null hypothesis. These models are known as disequilibrium models, so named because they are not closed by an equilibrium condition as in expression (3).

To illustrate the possible misspecification that might arise in equilibrium models some results of estimating a disequilibrium model of the New Zealand market for trading bank loans to the agricultural sector are discussed. The results indicate that, for this market and sample period, an equilibrium model could have been a serious misspecification of the actual market.

Techniques for estimating single market disequilibrium models are well established in the literature. Pioneers in the field included Bowden (1978), Fair and Jaffee (1972), Fair and Kelejian (1974), Amemiya (1974) and Maddala and Nelson (1974). Recent surveys of disequilibrium econometrics are Goldfeld and Quandt (1981), Maddala (1983, 1986), Quandt (1982) and Rudebusch (1987).

A GENERAL MODEL

When D, and S, are Observed

The simplest disequilibrium model imaginable would consist of (1) and (2) only. If data on both D_t and S_t were available the model could be estimated directly using standard regression techniques. In this case it would be known with certainty that the market was not in equilibrium. Unfortunately both D_t and S_t are seldom observed: usually only Q_t , the quantity actually transacted, is observed. Therefore this simple model has little application and is not discussed further in this paper.

When Only Q, is Observed

When only Q_t is observed some assumption about the nature of disequilibrium is necessary. It is commonly assumed that Q_t satisfies the minimum of either the demand or supply schedule so that the model comprises (1), (2) and

$$Q_{+} = \min \{D_{+}, S_{+}\}.$$
 (4)

Models that utilise (4) are referred to as "short side" models because it is the short side of the market that determines Q_t . Fair and Jaffee (1972) pointed out that it is not necessary to assume that either the demand or supply schedule is satisfied but it does simplify estimation and is consistent with maximising behaviour (see Bennassy, 1982, ch 2).

Maddala and Nelson (1974) provided a maximum likelihood method for estimating the general model when only Q_t is observed. Let τ_t be the probability that D_t is less than S_t , that is,

$$\mathbf{r}_{t} = \mathbf{pr}(\mathbf{D}_{t} < \mathbf{S}_{t}). \tag{5}$$

Substitute (1) and (2) into (5) to obtain

$$\tau_{t} = \operatorname{pr}(\mathbf{u}_{t} - \mathbf{v}_{t} < \mathbf{y}_{t}^{1}\beta - \mathbf{x}_{t}^{1}\alpha).$$
(6)

Since u and v are normally and independently distributed, (u-v) is normally distributed with constant variance $\sigma^2 = \sigma_u^2 + \sigma_v^2$. Therefore,

$$r_{t} = \int_{-\infty}^{(y_{t}^{1}\beta - x_{t}^{1}\alpha)/\sigma} (2\pi)^{-\frac{1}{2}} \exp\left[-\frac{1}{2}z^{2}\right] dz$$
(7)

where z is the vector (u_t, v_t) .

Now, define the following functions:

$$f_1(Q_t) = (2\pi\sigma_u^2)^{-\frac{1}{2}} \exp[-1/(2\sigma_u^2)(Q_t - x_t^1 \alpha)^2]$$
(8)

$$f_{2}(Q_{t}) = (2\pi\sigma_{v}^{2})^{-\frac{1}{2}} \exp[-1/(2\sigma_{v}^{2})(Q_{t}-y_{t}^{1}\beta)^{2}]$$
(9)

$$F_{1}(Q_{t}) = (2\pi\sigma_{u}^{2})^{-\frac{1}{2}} \int_{Q_{t}}^{\infty} \exp[-1/(2\sigma_{u}^{2})(D_{t}-x_{t}^{1}\alpha)^{2}] dD_{t}$$
(10)

and

$$F_{2}(Q_{t}) = (2\pi\sigma_{v}^{2})^{-\frac{1}{2}} \int_{Q_{t}}^{\infty} \exp[-1/(2\sigma_{v}^{2})(S_{t}-y_{t}^{1}\beta)^{2}] dS_{t}$$
(11)

Expressions (8) and (9) are density functions of demand and supply and (10) and (11) are cumulative distributions of Q_t given that Q_t belongs to the demand and supply equations respectively. Because Q_t belongs to the demand equation with probability τ_t , the unconditional density of Q_t (conditional on values of x_t^1) can be expressed as

$$f(Q_{t}|x_{t}^{1},y_{t}^{1}) = \tau_{t} \left[\frac{f_{1}(Q_{t}) \cdot F_{2}(Q_{t})}{\int_{\infty}^{\infty} f_{1}(Q_{t}) \cdot F_{2}(Q_{t}) dQ_{t}} \right] + (1-\tau_{t}) \left[\frac{f_{2}(Q_{t}) \cdot F_{1}(Q_{t})}{\int_{\infty}^{\infty} f_{2}(Q_{t}) \cdot F_{1}(Q_{t}) dQ_{t}} \right]$$
(12a)

Now, the denominators of (12a) are equal to τ_t and $(1-\tau_t)$ respectively so that the expression can be simplified to

$$f(Q_t|x_t^i, y_t^i) = f_1(Q_t) \cdot F_2(Q_t) + f_2(Q_t) \cdot F_1(Q_t)$$
 (12b)

From (12b) a log likelihood function

$$\log \mathbf{L} = \sum_{t}^{T} \log \left[\mathbf{f}_{1}(\mathbf{Q}_{t}) \cdot \mathbf{F}_{2}(\mathbf{Q}_{t}) + \mathbf{f}_{2}(\mathbf{Q}_{t}) \cdot \mathbf{F}_{1}(\mathbf{Q}_{t}) \right]$$
(13)

can easily be formed. After maximum likelihood estimates of parameters have been obtained, estimates of τ_t can be obtained from (7). These estimates can then be used to indicate the degree of disequilibrium in the market.

A MODEL WITH SAMPLE SEPARATION GIVEN

Estimation Using Subsamples

The main advantage of the general model outlined above is that it requires rather weak assumptions about market separation. However, in many applications it is possible to include information about price adjustment behaviour in the model. It might be hypothesised that:

 $\Delta P_{t} \stackrel{\geq}{\leq} 0 \text{ as } (D_{t} - S_{t}) \stackrel{\geq}{\leq} 0 \tag{14}$ where P_{t} is own price in time period t. Using (14), Q_{t} could be assigned to the demand or supply equation quite easily. If, for example, $\triangle P_t < 0$ then $(D_t - S_t) < 0$ and, according to the short side assumption in (4), Q_t would be assigned to the demand equation; if $\triangle P_t > 0$, Q_t would be assigned to the supply equation; and if $\triangle P_t = 0$, Q_t would be assigned arbitrarily to either the demand or supply equation.

Maddala and Nelson (1974) suggested a maximum likelihood method for the model consisting of (1), (2), (4) and (14). The conditional densities of Q_t given that Q_t belongs to

the demand and supply equations respectively can be expressed as

$$\mathbf{f}(\mathbf{Q}_{t}|\mathbf{Q}_{t} = \mathbf{D}_{t}) = \mathbf{f}_{1}(\mathbf{Q}_{t}) \cdot \mathbf{F}_{2}(\mathbf{Q}_{t}) / \tau_{t}$$
(15)

and

$$f(Q_t|Q_t=S_t) = f_2(Q_t).Fl(Q_t)/(1-\tau_t)$$
 (16)

The appropriate likelihood function is

$$\mathbf{L} = \prod_{t}^{\mathbf{m}} \frac{\mathbf{f}_{1}(\mathbf{Q}_{t}) \cdot \mathbf{F}_{2}(\mathbf{Q}_{t})}{\tau_{t}} \cdot \prod_{t}^{\mathbf{n}} \frac{\mathbf{f}_{2}(\mathbf{Q}_{t}) \cdot \mathbf{F}_{1}(\mathbf{Q}_{t})}{1 - \tau_{t}}$$
$$\cdot \left\{ \prod_{t}^{\mathbf{m}} \tau \prod_{t}^{\mathbf{n}} (1 - \tau_{t}) \right\}$$
(17)

where t, ...m is the set of observations for which $Q_t = D_t$ and t, ...n is the set of observations for which $Q_t = S_t$ The last term in (17) is the probability that the particular sample separation (m, n) is observed. Simplifying and expressing in logarithmic form, the function can be expressed as

$$logL = \left\{ \begin{array}{l} \underset{t}{\overset{m}{\sum}} logf_{1}(Q_{t}) + \underset{t}{\overset{n}{\sum}} logF_{1}(Q_{t}) \\ + \left\{ \begin{array}{l} \underset{t}{\overset{m}{\sum}} logf_{2}(Q_{t}) + \underset{t}{\overset{n}{\sum}} logF_{2}(Q_{t}) \\ \end{array} \right\}$$
(18)

Because both parts of the right hand side of (18) contain no common parameters, maximising logL is the same as maximising each part separately. Furthermore, the function is similar to the estimator derived by Tobin (1958) for models with limited dependent variables, the main difference being that the Tobin model involves a lower threshold (usually zero) whereas (18) involves an upper threshold that varies with t (for example, $Q_t = D_t$ is observed whenever $D_t < S_t$). It should also be noted that (18) does not admit equilibrium observations unless they are arbitrarily assigned to either the demand or supply equation.

Estimation Using Full Sample

A disequilibrium model can be so formulated that both demand and supply equations can be estimated over the full sample rather than over separate subsamples. The model would consist of (1), (2), (4), (14) and either

$$\Delta P_t = P_{t+1} - P_t = \lambda (D_t - S_t)$$
(19a)

or

$$\Delta P_t = P_t - P_{t-1} = \lambda (D_t - S_t)$$
(19b)

where λ is a coefficient that represents speed of adjustment of price to disequilibrium. The former expression treats own price as being predetermined (D_t and S_t are based on the price quoted at the beginning of the period and, on the basis of excess demand in the period, price is revised for the next period) and the second expression treats own price as being endogenous (price is adjusted within the period without necessarily clearing the market).

In this model, the direction of price change can be regarded as an indicator of the state of the market. This is illustrated in Figure 1. When P_t exceeds equilibrium price (eg P_2) there must be excess supply, price will be falling and the demand schedule above equilibrium will be observed (because demand will be the short side of the market). Conversely, when P_t is less than equilibrium price (eg, P_o), there must be excess demand, price will be rising and the supply schedule below equilibrium will be observed (because supply will be the short side of the market). When P_t is equal to equilibrium price (P_2) both demand and supply schedules will be observed. Therefore

 $D_{+} = S_{+} - EXS_{+}$ (20)

(21)

and

 $S_t = D_t - EXD_t$

Exchange will not take place off both demand and supply schedules at a point such as Z because this is inefficient: at least one demander or supplier would like to exchange more of Q at price P_1 . The only efficient points are those that correspond to the minimum of supply or demand.



Returning to the algebraic model, the price adjustment process could be modelled, following Fair and Jaffee (1972) as,

$$\Delta P_t = \lambda_1 (D_t - S_t) \text{ or } S_t = D_t - \frac{1}{\lambda_1} \Delta P_t \text{ when } D_t - S_t > 0, 0 \le \lambda_1 \le \infty \quad (22a)$$

and

$$\Delta P_t = \lambda_2 (D_t - S_t) \text{ or } D_t = S_t + \frac{1}{\lambda_2} \Delta P_t \text{ when } D_t - S_t < 0, \quad 0 \le \lambda_2 \le \infty \quad (22b)$$

Utilising the short side assumption, estimating equations can be expressed as

$$Q_{t} = S_{t} = D_{t} - \frac{1}{\lambda_{1}} g_{t} \text{ where } g_{t} = \begin{cases} \Delta P_{t} \text{ if } \Delta P_{t} > 0\\ 0 \text{ otherwise} \end{cases}$$

$$= x_{t}^{1} \alpha - \frac{1}{\lambda_{1}} g_{t}^{+} u_{t} \qquad (23)$$

and

$$Q_{t} = D_{t} = S_{t} - \frac{1}{\lambda_{2}} h_{t} \text{ where } h_{t} = \begin{cases} -\Delta P_{t} \text{ if } \Delta P_{t} < 0\\ 0 \text{ otherwise} \end{cases}$$

$$= y_{t}^{1}\beta - \frac{1}{\lambda_{2}} h_{t}^{+}v_{t} \qquad (24)$$

These equations can be used to estimate parameters in (1) and (2). In addition, speeds of adjustment of price to disequilibrium can be estimated as reciprocals of $1/\lambda_1$ and $1/\lambda_2$. Furthermore, $(1/\lambda_1)g_t$ and $(1/\lambda_2)h_t$ estimate actual amount of excess demand and supply respectively.

Laffont and Garcia (1977) showed that (23) and (24) can be estimated consistently using two stage least squares. The variables g_t and h_t will be endogenous (even if P_t is predetermined) so that, in the first stage regressions they must be regressed against all predetermined variables and their predicted values used in the second stage regressions. If P_t is endogenous then P_t must also be regressed against all predetermined variables and predicted values used in the second stage.

Amemiya (1974) proposed an asymptotically efficient maximum likelihood estimator where $\lambda_1 = \lambda_2$ and P_t is predetermined. Laffont and Garcia (1977) modified the method for the case where $\lambda_1 \neq \lambda_2$. Let m be the number of sample points belonging to the demand equation and t, ...m the set of sample points belonging to the demand equation; let n be the number of sample points belonging to the supply equation and t, ...n the set of sample points belonging to the supply equation. Likelihood functions for demand and supply will be

$$L_{d} = (2\pi\lambda_{2}^{2} \sigma_{v}^{2})^{-m/2} \exp[-1/(2\lambda_{2}^{2}\sigma_{v}^{2}) \sum_{t}^{m} \{\Delta P_{t} - \lambda_{2}(Q_{t} - y_{t}^{1}\beta)\}^{2}]$$

$$\cdot (2\pi\sigma_{u}^{2})^{-m/2} \exp[-1/(2\sigma_{u}^{2}) \sum_{t}^{m} (Q_{t} - x_{t}^{1}\alpha)^{2}]$$
(25)

and

$$L_{s} = (2\pi\lambda_{1}^{2}\sigma_{u}^{2})^{-n/2} \exp[-1/(2\lambda_{1}^{2}\sigma_{u}^{2})\sum_{t}^{n} \{\Delta P_{t} - \lambda_{1}(Q_{t} - x_{t}^{1}\alpha)\}^{2}]$$

$$\cdot (2\pi\sigma_{v}^{2})^{-n/2} \exp[-1/(2\sigma_{v}^{2})\sum_{t}^{n} (Q_{t} - y_{t}^{1}\beta)^{2}] \qquad (26)$$

Note that in the above expressions summation is over sample points belonging to demand and supply respectively so that, for the entire sample, the likelihood function is their product. In logarithmic form the function is

$$logL = -Tlog(2\pi) -mlog\lambda_{2} -nlog\lambda_{1} -T(log\sigma_{u} - log\sigma_{v})$$

$$-1/(2\lambda_{2}^{2}\sigma_{v}^{2}) \sum_{t}^{m} \{\Delta P_{t} - \lambda_{2}(Q_{t} - y_{t}^{1}\beta)\}^{2}$$

$$-1/(2\sigma_{u}^{2}) \sum_{t}^{m} (Q_{t} - x_{t}^{1}\alpha)^{2}$$

$$-1/(2\lambda_{1}^{2}\sigma_{u}^{2}) \sum_{t}^{n} \{\Delta P_{t} - \lambda_{1}(Q_{t} - x_{t}^{1}\alpha)\}^{2}$$

$$-1/(2\sigma_{v}^{2}) \sum_{t}^{n} (Q_{t} - y_{t}^{1}\beta)^{2} \qquad (27)$$

Although (27) is complex its solution by iteration is relatively straight forward because the maximum likelihood normal equations for α , β , σ_u^2 and σ_v^2 are just the ordinary least squares normal equations when λ_1 and λ_2 are known.

Laffont and Garcia (1977) provided an asymptotically efficient maximum likelihood estimator for the model where $\lambda_1 \neq \lambda_2$ and P_t is endogenous. Their estimator is not reviewed in this paper because of space limitations.

Testing Hypotheses Concerning Equilibrium

Fair and Jaffee (1972), Hwang (1980) and Quandt (1978) discussed tests of the null hypothesis of equilibrium. In the least squares procedures the usual asymptotic standard error or t statistic can be used to test the null hypothesis of equilibrium, that is, that $1/\lambda_1 = 1/\lambda_2 = 0$. In the maximum likelihood procedure a test can easily be implemented using likelihood ratios. Restricted maximum

likelihood estimates can be obtained from (27) given that $\lambda_1 = \lambda_2 = \infty$. The likelihood ratio statistic would be

$$W = -2 \left[\log L_{\overline{\Theta}} - \log L_{\widehat{\Theta}} \right]$$
(28)

where $\overline{\theta}$ is the restricted and θ the unrestricted

parameter estimates of the log likelihood function. The statistic W would have a chi-square distribution with one degree of freedom if the null hypothesis was true.

EXTENSIONS

In the preceding paragraphs a number of methods of construction and estimation of disequilibrium models have been surveyed. The simplest model, applicable when both D_t and S_t are observed would consist only of a demand and supply equation. When only Q_{t} is observed more complex constructions would be necessary. For example the model could consist of demand and supply equations ((1) and (2))closed by a minimum condition ((4)). Such a model would be estimated over separate demand and supply subsamples using a maximum likelihood method. A model that could be estimated over the entire sample could consist of demand and supply equations and price adjustment equations such as (14) and (19a) or (19b) closed by a minimum condition. Such a model could be consistently estimated by two stage least squares and efficiently estimated by a maximum likelihood method.

Some extensions of these models have appeared in the literature. Of these, probably the most important have been the development of estimators applicable to models in which ΔP_+ is stochastic (that is, the price adjustment

equation contains an error term) and to models that include lagged endogenous variables either directly (by specification) or indirectly as a result of serial correlation in error terms (Quandt, 1978; Laffont and Monfort, 1979). Disequilibrium modelling has also recently been extended to multiple markets (Gourieroux, Laffont and Monfort, 1980; Ito, 1980).

SOME RESULTS OF A DISEQUILIBRIUM MODEL

Outline of the Model

Given the high degree of intervention in financial markets by government in New Zealand, at least until late 1984, it seems appropriate to use disequilibrium models in empirical financial market research. In this section some results of estimation of a quarterly disequilibrium model of the market for trading bank loans to the agricultural sector for the period 1970 to 1985 are discussed. Detailed discussion of construction and estimation of the model can be found in St Hill (1988); only a brief outline is provided here. The model was based on equations (23) and (24) with the interest rate treated endogenously. It was estimated by two stage least squares.

Factors hypothesised to affect demand included own interest rate, competing interest rates, farm income, spillover of excess demand from other markets and repeat business (customer loyalty). Variables such as investment were not included because they would have been affected by any credit rationing that occurred (Laffont and Garcia, 1977; Melitz and Pardue, 1973).

A number of data problems were encountered with the demand equation. First, data on gross new loans were unavailable so published data on loans outstanding were manipulated. By definition

$$(AO_t^d - AO_{t-1}) = A_t^d - RE_t$$
(29)

where AO_t^d = demand for trading bank agricultural loans outstanding in time period t;

- AO_{t-1} = trading bank agricultural loans outstanding in time period t-1;
- A^d_t = gross demand for new trading bank agricultural loans; and
- RE_t = repayments of existing trading bank agricultural loans

Second, because data for RE_t were unavailable it was assumed that

$$RE_{t} = g(AO_{t-1}), g^{1} > 0$$
 (30)

Third proxy data had to be substituted for the true data in a number of instances.

The estimating form of demand was

$$\log(AO_t - AO_{t-1}) = \alpha_1 \log TL_t + \alpha_2 \log CI_t + \alpha_3 \log T_t + \alpha_4 Q_t + (\alpha_5 - \alpha_6) \log AO_{t-1} + \alpha_7 SE1 + \alpha_8 SE2 + \alpha_6 XD_t + u_t$$
(31)

- where TL = weighted average interest rate on all
 trading bank term loans outstanding in time
 period t, a proxy for the interest rate on
 loans to the agricultural sector;
 - CI_t = weighted average interest rate on all Rural Bank loans outstanding, a proxy for competing interest rates;
 - T_t = agricultural terms of trade index, representing farm income;

- Q_t = a dummy variable with a value of unity when Rural Bank loans declined were increasing and zero otherwise, a proxy for spillover of excess demands from other markets;
 - $AO_{t-1} = as defined above, representing customer loyalty (to which coefficient <math>\alpha_5$ is attached) and repayments of existing loans (to which coefficient $-\alpha_6$ is attached);
- SE1,SE2 = seasonal dummy variables;

 $XD_{t} = \begin{cases} \triangle logTL_{t} & where \ \triangle logTL_{t} > 0; and \\ 0 & otherwise \end{cases}$

 u_t = an error term distributed N~(0, σ_u^2).

Expected signs on coefficients were negative for α_1 , α_3 , α_9 ; positive for α_2, α_4 ; and indeterminate for $(\alpha_5 - \alpha_6)$.

Supply of agricultural loans by trading banks was hypothesised to be determined by a scale constraint set by available resources (net new deposits) and institutional requirements for statutory and other reserves, by the rate of interest on loans to the agricultural sector, the rate of interest on other loans (in this case short term government securities), farm income and repeat business. Data problems similar to those encountered with the demand equation were encountered with the supply equation. The estimating form was

 $\log(AO_t - AO_{t-1}) = \beta_1 \log\{(1 - \hat{r}_t)(D_t - D_{t-1})\} + \beta_2 \log TL_t$ (32)+ $\beta_3 \log \beta_t$ + $\beta_4 \log T_t + (\beta_5 - \alpha_6) \log AO_{t-1}$ + $\beta_6 SE1$ + $\beta_7 SE2$ + $\beta_8 POL$ + $\beta_9 XS_t$ + v_t where \hat{r}_{+} = reserves ratio in time t (estimated by the author); D, = stock of trading bank deposits; B + = yield on short term government bonds; POL = dummy variable to account for abolition of statutory reserves ratios, with a value of unity in the March and June quarters 1985 and zero in all other quarters; $XS_{t} = \begin{cases} -\triangle \log TL_{t} \text{ when } \triangle \log TL_{t} < 0; \text{ and} \\ 0 \text{ otherwise} \end{cases}$ v_t = an error term distributed N~(0, σ_v^2).

330

Expected signs on coefficients were positive for β_1 , β_2 , β_4 ; negative for β_3 , β_9 ; and indeterminate for $(\beta_5^{-\alpha}\alpha_6)$.

Both demand and supply equations were estimated as nominal rather than real equations.

The Demand Side

Two stage least squares estimates of the demand coefficients are set out in Table 1. For comparison an equilibrium version of the demand equation was also estimated.

Looking first at the disequilibrium specification, it is clear that it performed quite well on the basis of reported statistics. All data were transformed to purge the equation of first order serial correlation of the error term and of heteroscedasticity associated with log AO_{t-1} . Signs on significant coefficients were as expected with the exception of TL_t . In the case of TL_t it is possible that the positive relationship arose because of lags in adjustment of the interest rate to chronic excess demand for trading bank loans of all types, a result of the disequilibrium process itself.

Estimates of excess demand based on equations (23) and (24) indicated that, during the period June 1970 to June 1985 there were only 15 quarters when there was no excess demand. In more than half of the quarters included in the sample relative excess demand exceeded 10 percent of the net change in loans to the agricultural sector outstanding and in 17 quarters relative excess demand exceeded 15 percent. (Caution should be used in interpreting these results because of data transformations and the fact that the excess demand variable was based on a proxy). In comparison to the disequilibrium results of estimation of the model, results of estimation for the equilibrium version were not very good. In particular, there was great disparity between disequilibrium and equilibrium estimates of coefficients on TL_t , Q_t and AO_{t-1} . Clearly,

the assumption of equilibrium would have involved a substantial misspecification given the particular data set.

The Supply Side

Results of estimating disequilibrium and equilibrium versions of the supply equation by two stage least squares are set out in Table 2. All data were transformed for heteroscedasticity. Supply was estimated as two separate regimes because of parameter instability and non-constancy of the estimated error variance. (Because there was only one non-zero value for XS_t in the second regime the

disequilibrium version was not estimated).

Regressor ^a	Disequi	librium	Equilibrium		
	Coefficient	Std Error	Coefficient	Std Error	
TLt	6.751	1.525***	2.393	1.894	
ci _t	-0.316	0.589	-0.142	0.835	
T _t	0.303	0.431	0.288	0.644	
۹ _t	0.360	0.105***	0.264	0.150	
AO _{t-1}	-2.356	0.508 ^{***}	-0.894	0.628	
SEL	1.799	0.528 ^{***}	3.343	0.657 ^{***}	
SE2	2.283	0.523***	3.783	0.657***	
XD _t	-29.957	6.041***			
$\bar{\mathbf{R}}^2$	0.83		0.67		
F	43.383*		21.109*		
S.E.E.	0.081		0.093		
D.W.	2.221		2.073		
Rho	-0.340(t=2.	604 ^{**})			

Table 1: Regression Results for Demand

- ^a All variables except dummy variables were expressed in natural logarithms and all variables were transformed for heteroscedasticity by dividing by logAO_{t-1}.
- *** Indicates that standard error was less than or equal to one-half of the value of the coefficient.
- ** Indicates that the statistic was significantly different to zero at the 95 percent confidence level.
- * Indicates that the statistic was significantly different to zero at the 99 percent confidence level.

332

Table 2: Regression Results for Supply^a

Regime 1 (M	arch 1970-Mar	ch 1976; March	1982-Septemb	er 1984)	
Regressor	Disequil	ibrium	Equilibrium		
	Coefficient	Std Error	Coefficient	Std Error	
$(\hat{1-\mathbf{r}}) \\ (\hat{\mathbf{D}}_{t}^{t}-\hat{\mathbf{D}}_{t-1})$	0.338	0.146***	0.322	0.110***	
TLt	1.031	3.098	0.972	3.025	
^B t	-0.639	0.840	-0.620	0.818	
T _t	-0.443	2.128	-0.111	0.893	
AO _{t-1}	-0.198	0.855	-0.194	0.840	
SEl	2.282	1.515	2.322	1.471	
SE2	2.506	1.561	2.554	1.509	
POL					
XSt	-19.235	111.528			
$\bar{\mathbf{R}}^2$ -	0.81		0.82		
F	22.121*		26.729*		
S.E.E.	0.069		0.068		
D.W.	2.134		2.160		

Regressor	Disequ	ilibrium ^b	Equilibrium		
<u></u>	Coefficient	Std Error	Coefficient	Std Error	
$(\hat{1-\mathbf{r}}) \\ (\hat{\mathbf{D}}_{t}^{t}-\hat{\mathbf{D}}_{t}-$	1)		0.060	0.023***	
TLt	-		2.179	2.695	
B _t			-1.328	0.802	
T _t			1.084	1.008	
AO _{t-1}			0.312	0.723	
SEl			-0.372	1.510	
SE2			-0.025	1.471	
POL			-2.078	0.552***	
xs ₊					
$\bar{\mathbf{R}}^2$	٨		0.98		
F	•		181.2*		
S.E.E.			0.35		
D.W.			2.038		
Rho			-1.000		
	E 010 [*]		a		
G.Q.	5.812		6.430		
Chow	26.996		29.065		
a See f	ootnotes to Tab	le l.		-	
b Diseq	uilibrium versi	on could no	ot be estimate	ed for this	
regin	e because all	observations	for XS, exce	pt one were	
-			τ		

Regime 1 corresponded with the periods March 1970 to March 1976 and March 1982 to September 1984, during which a high degree of government intervention occurred. Regime 2 corresponded with the periods June 1976 to December 1981 and December 1984 to June 1985, during which a low degree of government intervention occurred. Chow F statistics and Goldfeld-Quandt F statistics listed in the table indicate that estimation as two completely separate regimes was justified. Also, in the second regime there was high negative serial correlation in the error term (with rho insignificantly different to -1.0) and data were transformed appropriately.

As can be seen from the table, the R^2 and F statistics were high and coefficient signs were as expected (except that on T_+ in the first regime). However, almost all

coefficients appeared to be insignificantly different to zero. Further investigation revealed that there was some collinearity among regressors and both fourth and sixth order serial correlation were present in the error term. This could have biased estimates of standard errors, but given the small sample size in each regime there was nothing that could be done to overcome these problems.

CONCLUDING COMMENTS

The purpose of this paper was to introduce and review models that allow disequilibrium in their construction and estimation and to this end a number of single market disequilibrium models were outlined. Results of estimation of the disequilibrium model discussed above indicate that merely assuming equilibrium can amount to a gross misspecification if the market is actually in disequilibrium during the sample period. Although it has to be admitted that the supply side of the model did not turn out very satisfactorily, the demand side well illustrated the strengths of disequilibrium modelling.

In my opinion it is often not appropriate to assume equilibrium in empirical research. I hope that, in future, more use will be made of disequilibrium models given that they often allow equilibrium to be incorporated as a testable null hypothesis. Researchers ought to carefully consider what the disequilibrium modelling literature has to offer.

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