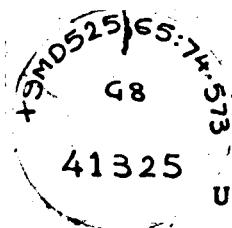


**JOHAN EINARSEN**

# **Reinvestment Cycles**

**and their Manifestation in the  
Norwegian Shipping Industry**



**PUBLICATION NO. 14  
UNIVERSITY INSTITUTE OF ECONOMICS**

Shantanujayarao Gadgil Library



GIPE-PUNE-041325

**REINVESTMENT CYCLES  
AND THEIR MANIFESTATION IN THE NORWEGIAN  
SHIPPING INDUSTRY**

# **REINVESTMENT CYCLES AND THEIR MANIFESTATION IN THE NORWEGIAN SHIPPING INDUSTRY**

**BY  
JOHAN EINARSEN**

**PUBLICATION NO. 14  
FROM THE UNIVERSITY  
INSTITUTE OF ECONOMICS, OSLO**

**OSLO 1938  
J. CHR. GUNDERSENS BOKTRYKKERI**

X9(MDS2S)65:74.573  
98

41325

## P R E F A C E

The plan of the present investigation I first presented to Professor Dr. Ragnar Frisch in November 1932. Mr. Frisch at once declared that I could use all my time as a research assistant in his department of the recently established University Institute of Economics in Oslo on this investigation and also placed at my disposal the necessary assistance and expert help from the staff of the Institute. I hereby express my deepest gratitude to Professor Frisch because in this way he made it possible for me to complete the present work.

The manuscript of the book — in Norwegian — was finished at the end of the year 1935. Since then no substantially new parts have been introduced, nor have reference to later publications been incorporated.

The translation into English was made mainly by the author and was afterwards checked by a Norwegian philologist. Since a non-economist cannot be supposed to have any particular knowledge of the special economic terminology I must myself assume responsibility for this and ask for indulgence for whatever-linguistic shortcomings there may be.

Works which are only published in Norwegian, Danish or Swedish I have quoted in English without each time expressively saying that the translation is made by the author.

At the preliminary statistical work cand. oecon. Erik Sæther worked for one and a half year as my assistant. In making the acturial part (Part IV, Life Characteristics) I had expert assistance from Messrs cand. act. Harald Holme and cand. oecon. Tobias Elias Hansen. I want to thank all of them for their interested cooperation.

The printing of the present book was made possible by generous grants from several Norwegian shipowners. I hereby express my sincere thanks to these contributors, and especially to Messrs Leif Høegh, Shipowner, and John O. Egeland, Secretary of Norges Rederforbund, for generous help.

Short summaries of the main results of the investigation have been published in the article «Reinvesteringssykler. Særlig bygget på data fra norsk skibsfart.» in *Nordisk Tidsskrift for Teknisk Økonomi*, Løbe Nr. 7, March 1937 and in the article «Reinvestment Cycles» in *The Review of Economic Statistics*, Volume XX, Number 1, Februar 1938.

Oslo, University Institute of Economics.

April 1938.

*Johan Einarsen.*

41325

## C O N T E N T S

	Page		Page
<b>Introduction.</b>			
§ 1. <i>The Business Cycle problem and its Setting</i> .....	1	<i>of Pure Reinvestment cycles are Present in Actual Life?</i>	50
§ 2. <i>Summary of the Main Points in the Present Work</i>	10		
<b>Part I. Dogmatic History.</b>		<b>Chapter 2. Amortization and Saving.</b>	
§ 1. <i>Introduction</i> .....	13	§ 1. <i>The Amortization Saving</i> ..	53
§ 2. <i>Karl Marx</i> .....	13	§ 2. <i>Amortization and Reinvestment Cycles</i> .....	55
§ 3. <i>Tugan-Baranowsky</i> .....	22	§ 3. <i>Individual and Social Saving</i> .....	57
§ 4. <i>Arthur Spiethoff</i> .....	25	§ 4. <i>Amortization Saving During the Depression is Merely Individual Saving</i> .....	59
§ 5. <i>Albert Aftalion</i> .....	27		
§ 6. <i>D. H. Robertson</i> .....	31		
§ 7. <i>A. C. Pigou</i> .....	32	<b>Chapter 3. The Maintenance Problem.</b>	
§ 8. <i>K. Schenheyder</i> .....	33	§ 1. <i>Automaintenance</i> .....	62
<b>Part II. Constructive Theory.</b>		§ 2. <i>Maintenance of Reinvestment Cycles by Outside Forces</i> .....	70
<b>Chapter 1. Pure Reinvestment Cycles.</b>			
§ 1. <i>Consumption Cycles, Mainly Concerning Reinvestment Cycles</i> .....	35	<b>Chapter 4. To What Extent can the Business Cycles be Explained by the Reinvestment Cycles?</b>	
§ 2. <i>Will the Reinvestment be Cyclical for Society as a Whole?</i> .....	36	§ 1. <i>Introduction</i> .....	83
§ 3. <i>Definition of some Terms</i> ..	39	§ 2. <i>The Turnover from Depression to Recovery</i> .....	83
§ 4. <i>A Survey of the Conditions for the Coming into Existence of Pure Reinvestment Cycles</i> .....	42	§ 3. <i>The Turnover from Prosperity to Recession</i> .....	92
§ 5. <i>Factors Determining the Reinvestment Time</i> .....	44	§ 4. <i>The Periodicity of the Business Cycles</i> .....	95
§ 6. <i>How Far May it be Presumed that the Conditions Necessary for the Creation</i>		<b>Part III. Statistical Investigation of the Reinvestment in the Norwegian Merchantile Marine 1883—1932.</b>	
		<i>Introduction</i> .....	100

Page	Page		
<b>Chapter 1. Some Historical and Statistical Dates About the Norwegian Mercantile Marine.</b>	<b>106</b>	<b>Chapter 5. Age Distribution of Replaced Ships.</b>	
§ 1. <i>The Material. Sources</i> ....	116	§ 1. <i>The Purpose of this Chapter. The «Cyclical Factor».</i> 141	
§ 2. <i>Preliminary Work. Tabulation of the Ships Arranged after the Shipowners</i> ....	117	§ 2. <i>Age Distribution of Ships Sold and Replaced. Typical Replacement Ages for the Whole Material and for Separate Periods</i> .....	142
§ 3. <i>Some Questions of Statistical—Technical Nature</i> ....	119	§ 3. <i>Age Distribution of Sold and Replaced Ships Divided in Phases of the Business Cycle</i> .....	146
<b>Chapter 3. Time Series of Newly Constructed Ships with an Attempt to Distinguish Between New Investment and Replacement.</b>		§ 4. <i>Total Investment with Regard to the Age of the Shipping Companies</i> .....	152
§ 1. <i>We Can Give a Statistical Expression only for the Replacement, not for the Reinvestment</i> .....	124	§ 5. <i>Excurs 1. The Tankship-building. A Typical «Pig Cycle»?</i> .....	153
§ 2. <i>The Procedure in Constructing our Time Series</i> .....	125	§ 6. <i>Excurs 2. Tinbergens «Shiffbauzyklus»</i> .....	156
§ 3. <i>Distinction between Replacement for Sold Ships and Replacement for Wrecked Ships</i> .....	131	<b>Part IV. Life Characteristics of Ships.</b>	
§ 4. <i>We have Made the Following Time Series for Quarterly Dates</i> .....	131	§ 1. <i>Introduction</i> .....	158
<b>Chapter 4. Analysis of time Series.</b>		§ 2. <i>We have Used Actuarial Methods</i> .....	159
§ 1. <i>Three Components</i> .....	133	§ 3. <i>The Distinction Between First-Owner Ships and Others. Characteristics We Find for First-Owner Ships</i> .....	159
§ 2. <i>The Five Years Cycle</i> .....	133	§ 4. <i>List of Symbols</i> .....	161
§ 3. <i>The Replacement is Leading</i> .....	136	§ 5. <i>Characteristics for Total</i> .....	162
§ 4. <i>That Replacement is Leading is in Accordance with the Theory of pure Reinvestment Cycles. The Exceptions may be Explained by Robert Liefmann's Theory</i> .....	138	§ 6. <i>The Elimination of the Material of the Period of the Great War</i> .....	165
§ 5. <i>Our Time Series do not say anything about the Reason why the Replacement is Leading</i> .....	139	§ 7. <i>Calculated Tables</i> .....	167
		§ 8. <i>Smoothed Probabilities</i> .....	168
		§ 9. <i>Results for the Material Not Divided in Time</i> .....	168
		§ 10. <i>Dividing the Material</i> .....	173
		§ 11. <i>Curves for Total</i> .....	182
		§ 12. <i>Appendix. Forecast of the Shipbuilding for Replacement in the Norwegian Shipping Industry</i> .....	182

## B I B L I O G R A P H Y

- Akerman, Johan:* Om det ekonomiska livets rytmik, Stockholm 1928.
- Aftalion, Albert:* La réalité des surproductions générales, Essai d'une théorie des crises générales et périodiques. (Revue d'économie politique. Paris 1908, 1909.)
- Tugan-Baranowsky, Michael von:* Studien zur Theorie und Geschichte der Handelskrisen in England, Jena 1901.
- Beckerath, Herbert von:* Technischer Fortschritt und Kapitalverschleiss in freier Konkurrenzirtschaft und gebundener Wirtschaft. (Kapital und Kapitalismus II, Berlin 1931.)
- Bouniatian, Mentor:* Les Crises Économiques. Deuxième Édition Française, Paris 1930.
- Bouniatian, Mentor:* Industrielle Schwankungen, Bankkredite und Warenpreise. (Archiv für Sozialwissenschaft und Sozialpolitik. Bd. 58, 1927.)
- Der Briefwechsel zwischen Friedrich Engels und Karl Marx 1844 bis 1883. (Herausgegeben von A. Bebel und Ed. Bernstein. Zweiter Band, Stuttgart 1913.)
- Calvin, H. C., and Stuart, E. G.:* The Merchant Shipping Industry, New York & London, 1925.
- Cassel, Gustav:* Theoretische Sozialökonomie. Vierte Auflage, Leipzig 1927.
- Census of Production (1907). Final report by the Director of the Census (A. W. Flux). London 1912.*
- Clark, J. Maurice:* Studies in the Economics of Overhead Costs. Chicago 1923. Third Impression 1929.
- Clark, John Maurice:* Some Social Aspects of Overhead Costs. (The American Economic Review, Suppl. March 1923. Vol. XIII, No. 1.)
- Clark, J. M.:* Capital Production and Consumer-Taking A. Reply. (The Journal of Political Economy. Volume XXXIX, 1931.)
- Clausen, A. Rye:* Bidrag til en rationel Bestemmelse af Tidspunktet for Fornyelsen eller Ändringen af et producerende Anlæg. (Ingeniørvidenskabelige Skrifter. B. Nr. 7, København 1932.)
- Eckel, Edwin C.:* Coal, Iron and War. London.
- Egeland, John O.:* Norges Sjøfart (Sjømannsboken, Publication of the Norges Biblioteksforening, Oslo, 1930.)
- Fayle, C. Ernest:* The War and the Shipping Industry. Oxford 1927. (Economical and social History of the World War. British Series. Publ. of the Carnegie End. for intern. Peace.)
- Fisher, Irving:* Our unstable Dollar and the so-called Business Cycle. (Journal of the American Stati-

- stical Association. Volume XX.  
Nos. 149—152. 1925.)
- Frisch*, Ragnar: 1) Mimeographed lectures, Makrodynamik for økonomiske systemer, høstsemestret 1933.
- 2) Sammenhengen mellem præmivestering og reinvestering. (Statsøkonomisk Tidsskrift 1927.)
- 3) «Konjunkturene» (Verdensøkonomien i efterkrigstiden), Universitetets Radioforedrag, Oslo 1933.)
- 4) Review of Johan Åkerman: Om det ekonomiska livets rytmyk. (Statsvetenskaplig Tidskrift, Lund, 1931.)
- 5) Discussion with J. M. Clark in The Journal of Political Economy:  
a) The Interrelation between Capital Production and Consumer-Taking. Oktober 1931.
- b) Capital Production and Consumer-Taking — A Rejoinder. April 1932.
- c) Capital Production and Consumer-Taking — A Final Word. October 1932.
- 6) Konjunkturbevegelsen som statistik og som teoretisk problem. (Förhandlingar vid Nordiska Nationalekonomiska Mötet i Stockholm 15.—17. juni 1931.)
- 7) Propagation Problems and Impulse Problems in Dynamic Economics. (Publication Nr. 3 of the University Intitute of Economics. Oslo 1933. Originally published in: Economic essays in honour of Gustav Cassel. London 1933.)
- Gardner*, George: Life Tables for Automobiles. (The Quarterly Journal of Economics, February 1933.)
- Griffin*, C. E.: The Life History of Automobiles. (Michigan Business Studies. Vol. 1, No. 1. February 1926.)
- Hansen*, Alvin Harvey: Business-Cycle Theory. Its Development and Present Status. Boston 1927.
- Hansen*, Alvin H., and *Tout*, Herbert: Investment and Saving in Business Cycle Theory (Annual Survey of Business Cycle Theory. Econometrica. Vol. 1, Nr. 2. April 1933.)
- Hayek*, Friedrich A.: Preise und Produktion. (Beiträge zur Konjunkturforschung herausgegeben vom Österreichischen Institut für Konjunkturforschung 3. Wien 1931.)
- Helander*, Sven: Die internationale Schifffahrtskrise und ihre weltwirtschaftliche Bedeutung. Jena 1928. (Probleme der Weltwirtschaft. Schriften des Instituts für Weltwirtschaft und Seeverkehr an der Universität Kiel. Herausgegeben von Dr. Bernhard Harms. Nr. 42.)
- Hotelling*, Harold: A general mathematical theory of depreciation. (Journal of the American Statistical Association. September 1925.)
- Kapital* und Kapitalismus. Vorlesungen gehalten in der Deutschen Vereinigung für Staatswissenschaftliche Fortbildung. Herausgegeben von Harms, Bernhard. Bd. I. u. II. Berlin 1931.
- Kapitalbildung* und Investitionen in der deutschen Volkswirtschaft 1924 bis 1928. von *Keiser*, Günther, und *Benning*, Bernhard (Vierteljahrshefte zur Konjunkturforschung. Sonderheft 22. Berlin 1931.)
- Keynes*, John Maynard: A Treatise on Money. Volume II. The Applied Theory of Money. London 1930.
- Kurtz*, E. B.: Life Expectancy of Physical Property. 1930.
- Lederer*, Emil: Kapitalbildung aus Einkommen. (Kapital und Kapitalismus I. Berlin 1931.)
- Lescure*, Jean: Des Crises Générales et Périodiques de Surproduction. Paris 1907.
- Liepmann*, Robert: Theorie des Sparsens und der Kapitalbildung. (Jahr-

- bücher für Gesetzgebung, Verwaltung und Volkswirtschaft im Deutschen Reich, Herausgegeben von Gustav Schmoller. 36. Jahrgang 2, 1912.)
- Lotka, Alfred J.*: Industrial Replacement. (Extracted from the Skandinavisk Aktuarietidskrift 1933. Uppsala 1933.)
- Machlup, Fritz*: Börsenkredit, Industriekredit und Kapitalbildung. (Beiträge zur Konjunkturforschung. Herausgegeben vom Österreichischen Institut für Konjunkturforschung. 2. Wien 1931.)
- Marx, Karl*: Das Kapital. Kritik der politischen Oekonomie. Herausgegeben von Friedrich Engels. Band II., Hamburg 1903, Band III., Hamburg 1894.
- Mitchel, Wesley C.*: Business Cycles. New York 1930.
- Morgenstern, Oskar*: Qualitative und Quantitative Konjunkturforschung. (Zeitschrift für die gesamte Staatswissenschaft, 85. Band, 1928. Heft 1.)
- Neisser, Hans*: Die Schichtung der Konjunkturtheorie. (In: Der Stand und die nächste Zukunft der Konjunkturforschung. Festschrift für Arthur Spiethoff. München 1933.)
- Norges Rederforbund*: Nogen statistiske oplysninger om norsk og utenlands skibsfart, 1925.
- Norges Rederforbund*: Skibsfartsstatistikk og konjunkturbetrakninger, 1930.
- Norways Official Statistics*.
- Ohlin, Bertil*: The Course and Phases of the World Economic Depression. (Report presented to the Assembly of the League of Nations. Series of L. of N.s Publications. II. Economic and Financial. 1931. II A. 21.)
- Ohlin, Bertil*: Ungelöste Probleme der gegenwärtigen Krisis. (Weltwirtschaftliches Archiv. 36. Band. Heft 1. Juli 1932.)
- Ohlin, Bertil*: Ett konjunkturuppsvings förutsättningar och möjligheter. (Skrifter, utgivna av Svenska Bankföreningen, 55. Stockholm 1933.)
- Pigou, A. C.*: Industrial Fluctuations. London, 1927.
- Prion, Willi*: Die Selbstfinanzierung der Unternehmungen. (Kapital und Kapitalismus I. Berlin 1931.)
- Robertson, D. H.*: Some Material for a Study of Trade Fluctuations. (Journal of the Royal Statistical Society. Vol. LXXVII, Year 1913—14. London 1914.)
- Robertson, D. H.*: Shipping and Shipbuilding. (London & Cambridge Economic Service. Special Memorandum No. 3. July 1923.)
- Robertson, D. H.*: Banking Policy and The Price Level. An Essay in the Theory of the Trade Cycle. Second Impression. London 1926.
- Roos, C. F.*: A Mathematical Theory of Depreciation and Replacement. (American Journal of Mathematics, Vol. L, No. 1. January 1928.)
- Schiff, Erich*: Kapitalbildung und Kapitalaufzehrung im Konjunkturverlauf. (Beiträge zur Konjunkturforschung, herausgegeben vom Österreichischen Institut für Konjunkturforschung. 4. Wien 1933.)
- Schiff, Erich*: Technischer Fortschritt als Kostenfaktor. (Zeitschrift für Nationalökonomie. 2. 1930—31.)
- Schmidt, F.*: Die Industrieconjunktur — ein Rechenfehler! («Zeitschrift für Betriebswirtschaft.» Jahrg. 1927. Heft 1. und 2.)
- Schönheyder, K.*: Produktionscyklerne og kriserne. (Statsekonomisk Tidskrift 1927, H. 2—3.)

- Schumpeter*, Joseph: Die Wellenbewegung für Wirtschaftslebens. (Archiv für Sozialwissenschaft und Sozialpolitik. 39. Band. Tübingen 1915.)
- Schumpeter*, Joseph: Theorie der wirtschaftlichen Entwicklung. (Zweite, neu bearbeitete Auflage, München 1926.)
- Schumpeter*, Joseph: The Explanation of the Business Cycle. (Economica, December, 1927. No. 21. London.)
- Schumpeter*, Joseph: Das Kapital im wirtschaftlichen Kreislauf. (Kapital und Kapitalismus I. Berlin 1931.)
- Snider*, Joseph Lyons: Business Statistics. A Book of Cases and Materials. New York 1929.
- Spiethoff*, Arthur: Vorbemerkungen zu einer Theorie der Überproduktion. (Schmollers Jahrbücher 1902.)
- Spiethoff*, Arthur: Die Krisentheorien von M. v. Tugan-Baranowsky und L. Pohle. (Schmollers Jahrbücher 1903.)
- Spiethoff*, Arthur: Die äussere Ordnung des Kapital- und Geldmarktes. (Schmollers Jahrbücher 1909.)
- Spiethoff*, Arthur: Art. «Krisen». (Handwörterbuch der Staatswissenschaften. Vierte Auflage. Jena 1925.)
- Tinbergen*, J.: Ein Schiffbauzyklus? (in: Weltwirtschaftliches Archiv. 34. Band. (1931 II) p. 152 sq.)
- Zimmermann*, Kurt: Das Krisenproblem in der neueren Nationalökonomischen Theorie. Halberstadt 1926.
- Winfrey*, R. and *Kurtz*, E. B.: Life Characteristics of Physical Property. (Bulletin 103 of the Iowa Engineering Experiment Station, Iowa State College 1931.)
- Wolff*, Hellmuth: Lehrbuch der Konjunkturforschung, Berlin 1928.

## N A M E I N D E X

- Akermann, Johan, 34, 61, 65, 72.  
Aftalion, Albert, 4n, 27—31, 36, 37,  
88, 104.  
Beckerath, H. v., 75n, 79.  
Benning, Bernhard, 54n.  
Birck, L. V., 34.  
Bouniatian, Mentor, 4n, 80, 99n.  
Calvin, H. C., 108.  
Cassel, G., 64, 69, 88, 140n.  
Clark, J. M., 9n, 36, 37, 47, 61, 63,  
70n, 92, 93.  
Clausen, A. Rye, 46, 49, 76.  
Eckel, G., 79.  
Engels, Friedrich, 18, 19, 49, 103.  
Fayle, C. Ernest, 108, 136.  
Fischer, Irving, 6n, 72.  
Frisch, Ragnar, 2n, 7n, 8n, 9, 34,  
41, 59, 62, 70n, 73, 92, 93, 97n,  
98n, 129, 168n.  
Gardner, George, 51.  
Griffin, C. E., 44n, 45n, 51.  
Hansen, Alvin H., 5n.  
Helander, Sven, 64, 113, 127n.  
Hull, George H., 40.  
Jevons, W. S., 2n, 71n, 95.  
Keiser, Günther, 54n.  
Keynes, J. M., 59, 60, 86.  
Kurtz, E. B., 51, 99, 101, 103, 159.  
Lederer, Emil, 66.  
Lescure, Jean, 23, 25n, 31n, 39.  
Liefmann, R., 68, 77, 78, 79, 91, 138.  
Machlup, Fritz, 54n, 78n.  
Marx, Karl, 13—22, 38, 45, 46, 53,  
56, 75n, 100.  
Mitchell, W. C., 5n, 6, 32, 95, 96.  
Morgenstern, Oscar, 8n, 91n.  
Neisser, Hans, 5n, 6n.  
Ohlin, Bertil, 50, 55n, 88n, 89n.  
Pigou, A. C., 32, 71n, 72, 74, 91n,  
99.  
Prion, Willi, 47, 67.  
Robertson, D. H., 5n, 13, 17, 31—32,  
38, 58, 60, 94, 101, 115, 126n, 146.  
Shiff, Erich, 37, 41n, 54n, 56, 67,  
70n, 76n, 78n, 87n, 89n.  
Schmidt, F., 37.  
Schumpeter Joseph, 1n, 3n, 43, 69,  
72, 74, 82, 84n, 90, 91, 96.  
Schønheyder, Kristian, 13, 33—34,  
38, 51n, 52, 64, 75, 99, 100, 103,  
105.  
Snider, J. L., 40, 50n.  
Spiethoff, Arthur, 25—27, 36, 37,  
86, 87n, 89, 94.  
Stuart, E. G., 108.  
Sundt, Eilert, 38, 42.  
Tinbergen, J., 9n, 50n, 126n, 156,  
157.  
Tugan-Baranowsky, M. v., 14, 16,  
22—27, 58, 60, 66, 71, 85, 86, 89,  
94, 96.  
Wallace, W., 3n.  
Walras, L. M. E., 92.  
Wicksell, Knut, 58, 73, 74.  
Winfrey, R., 51, 159.

**CHECKED**  
2003-04

**TRYKK: J. CHR. GUNDERSEN, OSLO**