IRSTI 06.81.23

Sadykhanova G.[1], Isatayeva G.[2]

[1]Candidate of Economic Sciences, Acting Professor, al-Farabi Kazakh national university,
Kazakhstan, Almaty, e-mail: gulnara.sa@gmail.com
[2]Candidate of Economic Sciences, South Kazakhstan State Pedagogical University, Kazakhstan, Shymkent

MODERNIZATION OF HIGHER EDUCATION AND SCIENCE FINANCING SYSTEM IN KAZAKHSTAN

The education system is an essential component of the socio-economic system of the state, which has an impact on all aspects of its activities. The influence of education on economic growth is proved by leading Russian, domestic and foreign economists. The implemented reform in the sphere of higher education is aimed at the simultaneous solution of a number of problems: first of all, to improve the quality of education and training of personnel, integration into the international educational space, structurally-substantial academic design is adequate to the needs of society, the state, employers, the individual. Higher education and the science system are subject to radical changes in the world closely related to the implementation of the idea of a knowledge-based economy. Funding plays a very important role here, in fact its function and effect. The level of expenditures and the way of their distribution is today about the potential of a given country. In the most developed economies, the financing of higher education and science is closely related to the efficiency, needs of the enterprise sector and is a derivative of healthy competition. This article is devoted to the problems of financing the education and science systems in Kazakhstan in conditions of the formation of a knowledge-based economy. The main stages of budgetary and extra-budgetary financing of educational institutions are considered. Studied models of normative financing of education, features, problems and consequences of their implementation. The article is intended for specialists in the field of economics, management and financing of the education and science system.

Key words: financing of higher education, education and science, modernization of higher education.

Садыханова Г.А.[1], Исатаева Г.Б.[2]

[1]э.ғ.к., профессор м.а., әл-Фараби атындағы Қазақ ұлттық университеті,
Қазақстан, Алматы қ., e-mail: gulnara.sa@gmail.com
[2]э.ғ.к., Оңтүстік Қазақстан мемлекеттік педагогикалық университеті, Қазақстан, Шымкент қ.

Қазақстанда жоғары білім мен ғылымды қаржыландыруды жаңғырту

Білім беру жүйесі мемлекет қызметіне жан-жақты әсер ететін, оның мемлекеттің әлеуметтік-экономикалық жүйесінің маңызды компоненті. Білім берудің экономикалық өсімге ықпалы ресейлік, отандық және шетелдік жетекші экономистермен дәлелденген. Білім беру саласындағы жүзеге асырылып жатқан реформа бірқатар мәселелерді бірден шешуге бағытталған: білім беру мен кадрларды дайындау сапасын көтеру, халықаралық білім беру кеңістігіне интеграциялау, қоғам, мемлекет, жұмысберушілер, жеке тұлға қажеттіліктеріне сәйкес құрылымды-мазмұндық академиялық реттеу. Ғылыми сыйымдылығы жоғары экономиканың қалыптасуымен байланысты экономикалық реформаларды жүзеге асырумен байланысты әлемдегі радикалды өзгерістер білім мен ғылымға сөзсіз әсер етеді. Білім мен ғылымды қаржыландыру өте маңызды рөл атқарады. Шығындар деңгейі және оларды тарату тәсілдері елдің әлеуеті туралы мәлімет береді. Жақсы дамыған елдерде жоғары білім мен ғылымды қаржыландыру инновациялық іс-әрекеттің тиімділігімен тығыз байланысты және таза бәсекенің туындысы болады. Бұл мақала Қазақстанда ғылыми сыйымдылығы жоғары экономиканың қалыптасу жағдайында білім мен ғылым жүйесін қаржыландыру мәселелеріне арналған. Білім беру мекемелерін бюджеттік және бюджеттен тыс қаржыландыруды ұйымдастырудың өзгерісінің негізгі кезеңдері қарастырылған. Білім беруді қаржыландырудың нормативті модельдері, олардың ерекшеліктері, мәселелері және оларды

жүзеге асыру салдарлары зерттелген. Мақала білім беру және ғылым жүйесін басқару және қаржыландыру, экономика салаларындағы мамандарға арналған.

Түйін сөздер: жоғары білімді қаржыландыру, ғылым және білім, жоғары білімді жаңғырту.

Садыханова Г.А.[1], Исатаева Г.Б.[2]
[1]к.э.н., и.о. профессора, Казахский национальный университет имени аль-Фараби,
Казахстан, г. Алматы, e-mail: gulnara.sa@gmail.com
[2]к.э.н., Южно-Казахстанский государственный педагогический университет, Казахстан, г. Шымкент

Модернизация системы финансирования высшего образования и науки в Казахстане

Система образования является важнейшим компонентом социально-экономической системы государства, оказывающим воздействие на все стороны его деятельности. Влияние образования на экономический рост доказано ведущими российскими, отечественными и зарубежными учеными-экономистами. Осуществляемая реформа в сфере высшего образования направлена на одновременное решение ряда проблем: прежде всего, на повышение качества обучения и подготовки кадров, интеграцию в международное образовательное пространство, структурно-содержательное академическое оформление адекватно потребностям общества, государства, работодателей, личности. Несомненно, образование и наука более подвержены радикальным изменениям в мире, тесно связанным с реализацией экономических реформ по становлению наукоемкой экономики. Финансирование науки и образования играет здесь очень важную роль. Уровень расходов и способ их распределения сегодня говорит о потенциале данной страны. В наиболее развитых странах финансирование высшего образования и науки тесно связано с эффективностью инновационной деятельности и является производным от здоровой конкуренции. Данная статья посвящена проблемам финансирования системы образования и науки в Казахстане в условиях становления наукоемкой экономики. Рассматриваются основные этапы изменения организации бюджетного и внебюджетного финансирования образовательных учреждений. Исследуются модели нормативного финансирования образования, особенности, проблемы и последствия их реализации. Статья ориентирована на специалистов в области экономики, управления и финансирования системы образования и науки.

Ключевые слова: финансирование высшего образования, образование и наука, модернизация высшего образования.

Introduction

Kazakhstan has practically used simple development reserves and is entering a period where innovation is of key importance. Meanwhile, there is no doubt that the level of studies is usually poor, the number of graduates do not increase innovation, also the contribution of Kazakhstan science to the development of the economy is extremely modest and cooperation with enterprises is marginal. Since for 20 years of free Kazakhstan we have not managed to create an effective system that ensures a high level of science and higher education, now we must learn at an accelerated pace from those who can and be ready to introduce bold solutions. The priority of our country should be today the introduction of effective, just and rational financing of education and science.

In the 2016/2017 academic year, 477074 were educated in 130 higher education schools of all types of students. The dominant position in the revenues of Kazakhstan universities is the revenue from didactic activities. When analyzing revenues, it should be noted that when it comes to revenues from research activities, they are strongly concentrated in a small group of universities: 25 universities receive 84% of funds for research, and 50% of all funds go to 8 universities. At the same time, the same 25 universities receive as much as 62% of all revenues from didactic activities. Universities, which receive most of the funds for research, are therefore not, as in other countries, specialized research units sporadically dealing with didactics. The concentration of funds for research activities at these universities results rather from the large scale of their didactic activity (Badat C., 2012: 98; Bruce D., 1999: 405; Palier B., 2010: 119). It is also worth emphasizing the fact that the revenues from scientific and research activities of public universities in 2018 amounted to over KZT 2 billion, and only a small part of these funds came from sources outside the budget (for universities alone it was only about 4% of total revenues, for polytechnic a dozen or so percent).

The research and development spheres in Kazakhstan include the following types units:

– scientific institutions of the Kazakhstan Academy of Sciences including scientific institutes and independent scientific institutions,

– research and development units (abbreviated as JBRs),

– private entities whose main activity has been classified to "Science" Law,

– higher education: public and private R & D - within this scope in business

– science service units (scientific libraries, archives, associations, foundations, etc.),

– development units,

– other units.

Methodology

The basis of the dissertation research is the scientific works and practical developments of domestic and foreign scientists on the financial problems of higher education. The methodological basis of the study was economic laws and regularities, fundamental provisions and concepts of financing higher education. The main instrument of the study was the methodology of the system and program-target approach to financing higher education.

In the process of research, the following methods were used: economic-statistical, abstract-logical, expert, mathematical modeling, methods of comparative analysis, groupings, classifications, average values, graphic images, and others.

The information base of the research was legislative and normative legal acts in the field of education, as well as regulating higher education finances, state and departmental statistics data, reporting and analytical materials of the Ministry of Education and Science of the Republic of Kazakhstan, its subordinate national centers, higher educational institutions.

Literature review

As it can be seen, the change in the structure of higher education fiancialization is needed immediately, because the funds allocated do not translate into the international level of Kazakhstan universities. In recent years, we have seen significant changes in funding systems in many countries. To cope with the rising costs, which are the result of, inter alia, an increasing number of students, new technologies and diversified specializations, European higher education institutions have two alternatives to maintain or improve their level of funding. They can demand additional funds from governments or raise funds from private entities. With regard to the latter, they can take one of two forms. First of all, these are expenses of students and their families not only in the form of tuition, but also in the form of fees for auxiliary services, such as accommodation or meals. Second, from private enterprises, non-profit organizations and work organization (Coughlan F., 2007: 77; Hochschild F., 2001: 119; Morel N., 2007: 618). All these expenditures constitute the private sector's contribution to the financing of higher education institutions. However, it should be noted that even when educational institutions receive funds from private entities, this does not mean that they were not originally from the government, eg in the form of transfers or social benefits. On the other hand, if we look at public budget expenditures, they are mainly intended for: financing the costs of teaching, operations and investments as well as research and development: including investments in equipment and equipment. In the European Union, higher education is largely financed from the public sector – this applies to over 70% of students in the whole community. Greece, Norway, France, Finland, Sweden, Ireland and Denmark are countries where public funding is almost the only source of financing for higher education (University of the Witwatersrand, 2008: 108). Nevertheless, looking at the United States, Japan or the South Korea the situation is reversed – the advantage of private spending: in the United States – 1.9% of GDP, South Korea. – 1.9% of GDP (United Nations, 2005: 602). And let us remember that these countries are the leaders in terms of innovativeness of the economy and effectiveness of education (Korotayev V., 2010: 118; Hsiao C., 2003: 160; Gavanas A., 2013: 105; Hiilamo H., 2015: 145).

Results

When analyzing the structure of financing R & D expenditures in Kazakhstan, we can see that it is practically a reversal of the proportions assumed in the Lisbon Strategy and the proportion of the most developed countries (USA, South Korea, Japan). Public funds from the state budget still hold the dominant position. In addition, in Kazakhstan we observe a low share of development work in expenditure on research and development. And yet it seems legitimate to treat the share of these works in general R & D expenditure as a specific measure of the so-called proximity to the market of scientific activity in a given country (Badat C., 2008: 160; Tollman S., 2007: 4).

Analyzing research and development expenditures in this respect, it is easier for us to determine the degree of connection between the world of science and the world of enterprises, and

thus answer the question whether research conducted by individual research units meets the demand reported by the production and services sector. One can assume the hypothesis that the higher the proportion of applied and applied research is, the greater the chance that the results of these works will find their practical application in the production of goods and services, thus contributing to increasing the innovation of the economy (Yaffee R., 2003: 180, Markus G., 1979: 279, Pavolini E., 2008: 246).

There is a great deal of international Kazakhstan higher education and Kazakhstan science and one could create their entire catalog, but for the purposes of this study, the Authors will focus on, in their opinion, two key one (Ballim Y., 2008: 230; Baltagi H., 2005: 240). The first one concerns the impact of Kazakhstan science and is reflected in the number of publications and the percentage of citations.

The weakness of Kazakhstan science demonstrated above encourages resignation from subsidies. The transfer of expenditures on scientific research should be carried out with the help of grants open to all (Hughes G., 2001: 460; Morel N., 2015: 133). From year to year, the subsidy should be limited (even by 10% less per year) to competitions. Kazakhstan found itself in a period where innovation would determine its economic position in the world. For this reason, the proposed changes should happen very quickly, eg within 2-3 years, but it is probably unrealistic (Barnett R., 2000: 488; Castells M., 1996: 169; Hall P., 2001: 480). At the same time, you should be rewarded for efficiency and high level of research. Following the example of Finland, the research team and its employer should receive a bonus / payment for:

– number of international publications, number of citations in magazines scientific

– the amount of funds obtained for research projects obtained on the competition basis and from other sources

– scope of participation in international scientific and research projects

– amount of orders obtained from the economy, etc.

– effects of implementing research results (licenses, copyrights, services provided, etc.)

Such a system of financing science will make today the dispersed potential of high quality staff will be integrated (Plantenga J., 2009: 240). Effective research teams will grow in strength, and universities and research institutions will be interested to hire them. In this way, flagship centers of Kazakhstan science will be created and this is a more effective way than administrative nomination.

It is in these centers that you can conduct studies at a high level and the state should be interested in better financing the studies conducted there.

Comparative analysis of higher education and science funding systems leads to the following conclusions:

1. In countries where learning and study are at a high level of funding system clearly differs from Kazakhstan

2. The main cause of so many diseases is the lack of healthy competition in the sphere science and higher education. It is amazing that referring in year's transformation of so many successes in various areas of life - thanks to the mentioned competition - we isolated from it the key area for the prosperity of Kazakhstan. We need to emphasize this once again: the key to the success of our country is the introduction to the sphere of science and higher education principles of fair competition, and this competition in this case must concern competitive access to public money.

There are no reasons or structural reasons that would make it impossible introduction of such pure competition to Kazakhstan higher education. What's more, it is not necessary to change the existing laws, despite their certain weaknesses, or spending additional funds.

Finally, we want to make it clear that although we represent a non-public university, our goal is not to defend the private sector at all costs. We even think that many of them are schools of shame and should disappear. However, we argue that without private schools, it is impossible to create a fair competition, which is a prerequisite for an increase in the level of study and the quality and efficiency of science (Dwolatsky B., 2008: 147; Wilson A., 2008: 234; Porter A., 2011: 485; Al Shami L., 2014: 1; Maddala K., 2009: 250: Baltagi H., 1992: 561). Employees in the public sector have to feel the breath of competition on their backs, they must lose certainty as to the stability of the job and finally didactics cannot be a source of such easy and good income.

Our solutions will ultimately make the budget support better, whether public or private. In addition, we also hope that it will effectively eliminate the bad ones.

We believe that funds for science and higher education should be significantly increased, but only after the introduction of fair competition rules, when we develop effective tools that increase the level and effectiveness. In addition, funding sources should be diversified, including creating a system that encourages companies to invest.

We express our conviction that the proposed solutions will also serve large public universities. Although the number of students will drop, funds for research and development projects will increase significantly. At the same time, the Rector's strong authority will enable the multiplication and development of good research teams at the expense of the latter. Good big universities have to stop participating in the race that will develop more and faster. They should show their effectiveness in the race for scientific and development achievements. They should also train staff for other universities. The above proposals may also be treated as a necessary transition period, preparing for further-reaching solutions, even those proposed since 2015 by the Ernst & Young Business Advisory consortium and the Institute for Market Economics - authors of the Strategy for the Development of Higher Education in Kazakhstan by 2020.

Conclusion

As a summary, the following design aspects can be derived:

Finance Sources

The increase of the finance volume from other than state sources is generally assessed to be positive. There is scepticism concerning the implications for the performance areas, e.g. emphasis on some areas and neglect of other areas (which might be important for society but are not "profitable"). There are conflicting views as to the (desirable) extent of attainable volume of third party resources. Opportunities to open further sources as e.g. to generate funds from investments and commercialisation of know how or tangible assets are seen to be rather limited. The increase of state competitive budget is favoured by a majority of the stakeholders. It is viewed to be of advantage in the areas of research and the development and exploitation of the arts.

Funding Orientation

Performance oriented funding is a major feature of the funding system, therefore it is focused on university output. However, there are also input-related criteria used to determine the budget volume. There is scepticism concerning the measurability of university outputs and the use of measures as basis for budget volumes. At the present, outcome orientation does not play any role: pertinent information can not be generated and there is no experience concerning the effects of the new system.

Budget Volume

There is a broad consensus that the state budget volume is low or too low. There is the demand for an increase in order to perform in sufficient quality and quantity. However, the given budget volume is also seen conducive to the realization of potentials of rationalization, economies and synergies.

Funding Instruments

Which instrument is seen to be more appropriate for the allocation of financial resources depends (amongst others) from the question "who has to take when which type of decision": the formula is based on past decisions on the relationship between funds and performance, resources needed in principle, demand and other criteria. At the time of the calculation of the formula-based budget no decision is taken any more. On the other hand, performance agreements and peer review procedures are determined by decisions of the negotiating parties and the reviewers. A crucial factor is the reference point of time of the instruments (this can be the past, the present or the future), i.e. past performance or input data or future criteria of goals and objectives are used as calculation basis. Another issue is the degree of the specific costs and efforts required for the use of instruments (e.g. transaction costs) and which benefits result. The study results show that peer review procedures are appropriate and effective for research and development and exploitation of the arts. Formula-based budgeting procedures are seen to be appropriate for the area of teaching. The performance agreement is viewed as instrument which, in principle and generally, is useful and effective for resource allocation in decentralised systems.

As overall conclusion it can be stated that in an objective way "the optimal funding system" does not exist and can not exist: the assessment of any system is always dependent from various interests, intended goals and the respective views. Concerning the design alternatives of the funding system, the study results indicate that there are various and contradicting ways and means. The majority of the interviewees would now prefer a phase of stability and consolidation which is seen to be useful and necessary.

References

Al Shami, Lotfi A., Coleman S. (2012). Unified knowledge based economy neural forecasting map, The 2012 International Joint Conference on Neural Networks (IJCNN), pp. 1–8, (ISSN 2161–4393).

Badat S. (2012). Valuing higher education. Joint Seminar of Higher Education South Africa and the Parliamentary Portfolio Committee on Higher Education and Training, Stellenbosch University: STIAS —Wallenberg Research Centre, 20 April 2012, Stellenbosch, pp. 98-106

Badat S. (2008). The trajectory, dynamics, determinants and nature of institutional change in post-1994 South African higher education. Presented at the Higher Education CloseUp 4 conference, Cape Town, June 2008, p. 160

Ballim Y (2008) Interview with Deputy Vice-Chancellor: Academic, University of the Witwatersrand, 13 November 2008, p. 230

Baltagi H.B. (2005). Econometric Analysis of Panel Data, vol. 3, John Wiley & Sons, New York, USA, p. 240

Barnett R. (2000). Realizing the university in an age of supercomplexity. SRHE and Open University Press, Buckingham & Philadelphia, p. 488

Baltagi H.B., Li Q. (1992). Prediction in the one — error component model with serial correlation. J. Forecast, 11 (1), P. 561–567.

Bruce D., Baker C., Richards E. (1999) A comparison of conventional linear regression methods and neural networks for forecasting educational spending, Econ. Educ. Rev., 18 (4), P. 405–515.

Castells M. (1996). The rise of the network society. Blackwell, Oxford, P.169

Coughlan F., Divala J., Enslin P., Kissack M., Mathebula T. (2007). Systemic governance, public accountability and institutional autonomy. In: CHE (ed) Review of higher education in South Africa, selected themes, August 2007. Council on Higher Education (CHE), Pretoria, pp 77–96

Dwolatsky B. (2008) MIT and the rise of entrepreneurial science. Routledge, London, P. 147

Gavanas A., Catharina C. (2013). Rena hem pa° smutsiga villkor? Stockholm: Makadam Fo¨rlag, P.105

Hall P., Soskice D. (2001). Varieties of capitalism—The institutional foundations of comparative advantage. Oxford: Oxford University Press, P. 480

Hiilamo H. (2015). The politics of domestic outsourcing in Finland and Sweden. In The political economy of household services in Europe, eds. C. Carbonnier, and N. Morel. Basingstoke: Palgrave Macmillan, P. 145

Hochschild A. (2001). Global care chains and emotional surplus value. In On the edge. Living with global capitalism, ed.W. Hutton, and A. Giddens. London: Vintage, P. 450

Hsiao C. (2003). Analysis of Panel Data, vol. 2, Cambridge University Press, New York, USA, P. 160

Hughes G. (2001). Aristotle on ethics. Routledge, London Ministry of Education (2001) The national plan for higher education. Ministry of Education, Pretoria, P. 460

Korotayev V.A., Tsirel V.S. (2010). A Spectral Analysis of World GDP Dynamics: Cycles in Global Economic Development, and the 2008/2009 Economic Crisis, Struct. Dyn, 4 (1), P. 118

Maddala K.L. (2009). Introduction to Econometrics, Wiley, UK, P. 250

Markus G.B. (1979). Analyzing Panel Data, vol. 1, Sage University Paper, California, USA, 270

Morel N. (2007). From subsidiarity to free choice: Child and elder care policy reforms in France, Belgium, Germany and the Netherlands. Social Policy & Administration, 41 (6), P. 618–37.

Morel N., Carbonnier C. (2015). Taking the low road: The political economy of domestic services in Europe. In The political economy of household services in Europe, ed. C. Carbonnier, and N. Morel. Basingstoke: Palgrave Macmillan, P. 133

Palier B., Kathleen T. (2010). Institutionalizing dualism: Complementarities and change in France and Germany. Politics & Society, 38 (1), P. 119–48.

Pavolini E., Costanzo R. (2008). Restructuring the welfare state: Reforms in long-term care in Western European countries. Journal of European Social Policy, 18 (3), P. 246–59.

Plantenga J., Chantal R. (2009). The provision of childcare services. A comparative review of 30 European countries. European Commission. Luxembourg: Office for Official Publications of the European Communities, P. 240

Porter A.L. (2011). Cunningham S.W., Banks J., Roper A.T., Mason T.W., Rossin F.A., Forecasting and Management of Technology,Wiley, P. 485

Tollman S, Kahn K (2007) Health, population and social transitions in South Africa. Scandinavian Journal of Public Health 35(69):4–7, August 2007, Taylor and Francis, UK

United Nations (2005) In: Juma C, Lee Y-C (eds) Innovation: applying knowledge in development, UN Millenium Project Task Force on Science, Technology and Innovation. Earthscan, London, P. 480.

University of the Witwatersrand (2008) Establishing the Wits Rural Observatory: business case. Report prepared by Mark Burke for the University of the Witwatersrand, Johannesburg, October 2008, 480 p.

Wilson A. (2008). Interview with Director of Economic Geology Research Institute, University of the Witwatersrand, 17 November 2008, P. 234

Yaffee R., A Primer for Panel Data Analysis, vol. 1, New York University Press, New York, USA, 2003. P. 180

References

Al Shami, Lotfi A., Coleman S., Unified knowledge based economy neural forecasting map, The 2012 International Joint Conference on Neural Networks (IJCNN), 2012, pp. 1–8, (ISSN 2161–4393).

Badat S (2012) Valuing higher education. Joint Seminar of Higher Education South Africa and the Parliamentary Portfolio Committee on Higher Education and Training, Stellenbosch University: STIAS —Wallenberg Research Centre, 20 April 2012, Stellenbosch, O 98-106

Badat S (2008) The trajectory, dynamics, determinants and nature of institutional change in post-1994 South African higher education. Presented at the Higher Education CloseUp 4 conference, Cape Town, June 2008 160

Ballim Y (2008) Interview with Deputy Vice-Chancellor: Academic, University of the Witwatersrand, 13 November 2008 230

Baltagi H.B., Econometric Analysis of Panel Data, vol. 3, John Wiley & Sons, New York, USA, 2005. 240

Barnett R (2000) Realizing the university in an age of supercomplexity. SRHE and Open University Press, Buckingham & Philadelphia 488

Baltagi H.B., Q. Li, Prediction in the one — error component model with serial correlation, J. Forecast. 11 (1) (1992) 561–567.

Bruce D. Baker, C.E. Richards, A comparison of conventional linear regression methods and neural networks for forecasting educational spending, Econ. Educ. Rev. 18 (4) (1999) 405–515.

Castells M (1996) The rise of the network society. Blackwell, Oxford 169

Coughlan F, Divala J, Enslin P, Kissack M, Mathebula T (2007) Systemic governance, public accountability and institutional autonomy. In: CHE (ed) Review of higher education in South Africa, selected themes, August 2007. Council on Higher Education (CHE), Pretoria, pp 77–96

Dwolatsky B (2008) Interview with head of Joburg Centre for Software Engineering, 11 November 2008 Etzkowitz H (2002) MIT and the rise of entrepreneurial science. Routledge, London 147

Gavanas, Anna, and Catharina Calleman, eds. 2013. Rena hem pa° smutsiga villkor? Stockholm: Makadam Fo¨rlag. 105

Hall, Peter, and David Soskice, eds. 2001. Varieties of capitalism—The institutional foundations of comparative advantage. Oxford: Oxford University Press. 480

Hiilamo, Heikki. 2015. The politics of domestic outsourcing in Finland and Sweden. In The political economy of household services in Europe, eds. C. Carbonnier, and N. Morel. Basingstoke: Palgrave Macmillan. 145

Hochschild, Arlie. 2001. Global care chains and emotional surplus value. In On the edge. Living with global capitalism, ed.W. Hutton, and A. Giddens. London: Vintage. 450

Hsiao C., Analysis of Panel Data, vol. 2, Cambridge University Press, New York, USA, 2003. 160

Hughes G (2001) Aristotle on ethics. Routledge, London Ministry of Education (2001) The national plan for higher education. Ministry of Education, Pretoria460

Korotayev V.A., Tsirel V.S., A Spectral Analysis of World GDP Dynamics: Cycles in Global Economic Development, and the 2008/2009 Economic Crisis, Struct. Dyn. 4 (1) (2010) (5/3/2012). 118

Maddala K.L.G., Introduction to Econometrics, Wiley, UK, 2009. 250

Markus G.B., Analyzing Panel Data, vol. 1, Sage University Paper, California, USA, 1979. 270

Morel, Nathalie. 2007. From subsidiarity to free choice: Child and elder care policy reforms in France, Belgium, Germany and the Netherlands. Social Policy & Administration, 41 (6): 618–37.

Morel, Nathalie, and Cle´ment Carbonnier. 2015. Taking the low road: The political economy of domestic services in Europe. In The political economy of household services in Europe, ed. C. Carbonnier, and N. Morel. Basingstoke: Palgrave Macmillan. 133

Palier, Bruno, and Kathleen Thelen. 2010. Institutionalizing dualism: Complementarities and change in France and Germany. Politics & Society, 38 (1): 119–48.

Pavolini, Emmanuele, and Costanzo Ranci. 2008. Restructuring the welfare state: Reforms in long-term care in Western European countries. Journal of European Social Policy, 18 (3): 246–59.

Plantenga, Janneke, and Chantal Remery. 2009. The provision of childcare services. A comparative review of 30 European countries. European Commission. Luxembourg: Office for Official Publications of the European Communities. 240

Porter A.L., Cunningham S.W., Banks J., Roper A.T., Mason T.W., Rossin F.A., Forecasting and Management of Technology,Wiley. com, 2011. 485

Tollman S, Kahn K (2007) Health, population and social transitions in South Africa. Scandinavian Journal of Public Health 35(69):4–7, August 2007, Taylor and Francis, UK

United Nations (2005) In: Juma C, Lee Y-C (eds) Innovation: applying knowledge in development, UN Millenium Project Task Force on Science, Technology and Innovation. Earthscan, London

University of the Witwatersrand (2008) Establishing the Wits Rural Observatory: business case. Report prepared by Mark Burke for the University of the Witwatersrand, Johannesburg, October 2008

Wilson A (2008) Interview with Director of Economic Geology Research Institute, University of the Witwatersrand, 17 November 2008 234

Yaffee R., A Primer for Panel Data Analysis, vol. 1, New York University Press, New York, USA, 2003. 180