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Devil and the Details

Italian water pricing reform between technical rules and political will

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1.Introduction

Environmental economics has emphasized the importance of addressing the users of natural resources with the appropriate signals, and advocates a widespread use of economic policy instruments (EPI) explicitly targeted at this purpose. The rationale behind EPIs is searched in their capability of altering at the margin the convenience of alternative actions, offering a privilege to those that are coherent with a more sustainable use of water resources (Strosser et al. 2013). For example, water pricing is advocated for providing a signal of scarcity and thence reduce water demand; taxes on water pollutants such as nitrates and pesticides are proposed in order to reduce their use, and so on (Gomez et al, 2013; Defrance et al., 2013).

We certainly do not intend to underrate the importance of providing incentives to final water users. However, the present paper aims at attracting attention on the fact that environmental sustainability depends not only on the individual behaviour of final users (how much water they use and how much they pollute it), but also – and probably much more, as far as domestic uses are concerned – on the collective choices concerning the management system of water resources: how are they selected and mobilized, how are they shared between competing uses, how are they treated; and more generally, how does the artificial system of water infrastructure interact and interfere with the natural water ecosystem.

Therefore, it is also important to consider incentives from the viewpoint of the subjects that run water service infrastructure, which should be motivated and enabled to invest in it. A further and not less important function of EPI, thence, should be that of (i) providing adequate incentives to water management system operators and (ii) ensuring their ongoing capacity to sustain financial obligations.

The latter dimension of the problem, in turn, changes substantially the approach to EPIs. As a fundamentally capital-intensive industry, whose costs are dominated by fixed components, it is paramount for water utilities to gather access to adequate sources of funding. Rather than providing an incentive at the margin, EPIs should be evaluated for their capacity to guarantee stable and reliable cash flows and ensure the service of debt, both for maintenance and replacement of already existing assets and new investments.

This aspect is perfectly exemplified by the recent Italian reform of water supply and sanitation services (WSS), which was launched in 1994 with the aim of establishing a self-sufficient water industry and permanently relieve the public budget of the burden of water investment.

2. Approaches to cost recovery in the water industry

2.1 The importance of financial sustainability

As a service of general interest, given the social concern about affordability and universal access, the economics of WSS is also conditioned by the fact that prices should not be so high that some consumers find it unaffordable.

No economic activity or industry, regardless of its area of concern, can survive in the long term if it is unable to recover its costs and remunerate inputs, and WSS is certainly no exception to this fact. The theory of industrial organization has elaborated its own definition of a sustainable business: the equilibrium price should ensure that markets are cleared (no consumers willing to pay that price are left unsatisfied), all firms in the industry recover their costs, including capital costs, and no extra profits encourage new suppliers to enter the market (Spulber, 1989).

WSS should therefore be able to sustain the generation of cash flows that allow this system to recover both operational and capital costs, continue functioning in the long term.

It is therefore crucial to monitor this aspect of sustainability, which is clearly related to how WSS operators have access to financial sources and obtain the revenues required for maintaining services – thus, pricing.

However, comparative studies on water pricing have so far scarcely focused on this dimension. Instead, they have concentrated mainly on ecological sustainability (use of prices as economic incentives for reducing water demand or pollution; discussion of the incentive structure behind the behaviour of demand for WSS), economic efficiency (prices as instruments ensuring that resource scarcity is conveniently accounted for and allocation rules designed in order to maximise social welfare) and social sustainability (impact of WSS price on family budgets; impact of different tariff structures in terms of affordability).

Full-cost recovery (FCR) is often recommended as a way to enforce the polluter-pays principle and achieve efficient resource allocation; in this meaning it represents a cornerstone, for example, of the EU Water Framework Directive, which extends this concept to include environmental externalities and scarcity costs.

We have argued elsewhere that this definition of full-cost recovery is conceptually misleading, since it mixes up issues regarding water as a natural resource and those regarding water services as an infrastructural business, both posing different and, to an extent, opposite requirements to pricing (Massarutto, 2007).

As a matter of fact, according to the standard theory of environmental economics, FCR is not strictly required for environmental sustainability, since what really matters is the adequacy of the economic incentive and not the mere recovery of costs; on the other hand, the standard theory of public utilities affirms that economic efficiency is concerned with marginal cost pricing; in the case of WSS, which is dominated by fixed costs, marginal costs are typically very low with respect to the full cost, hence an efficient provision of water services does not necessarily imply FCR.

In turn, FCR is fundamental in guaranteeing the viability of water companies and their capacity to survive in the long-term, meeting their financial obligations. The issue of the financial viability of water undertakings, however, is most often left behind by theorists of sustainability. It can be broadly defined as the ability of WSS to sustain the economic burden of running the system and provide investment to replace ageing infrastructure and expand it according to emerging requirements over time.

As in other capital-intensive industries such as motorway construction, WSS is based on the anticipation of high investment costs, which are mostly sunk; in order to service debt and remunerate capital, operations need to generate a stable flow of cash that exceeds the recovery of running costs. Economists label these cash flows as “quasi-rents” (Noll et al., 2000): a rent occurs whenever the revenue is higher than the marginal cost. While the best condition for achieving economic efficiency is charging at the marginal cost, the rent in this case is needed in order to recover the capital cost, as a second-best alternative in case other sources of finance are not available.

Hence, WSS should be able to generate high and stable operating margins in order to finance amortisation of debt and its service. However, since the time span is very long, there is a permanent temptation for regulators to “expropriate” these margins. This could be done in many ways: for example, by preventing tariffs from adapting to inflation, or by imposing taxes and fees that redirect part of the margin to the general budget. If the investment has still to be made, the reaction of the water company could be to restrain from investing; but once the investment is sunk, there will be no way to impede the raiding of funds.

This temptation becomes even more marked if we consider that the amount of the initial nominal value of the investment, depreciated by inflation, is reduced over such a long period of time. If assets are not revaluated, tariffs will allow the repayment of old debt, but will not enable to sustain new debt (for making investments today) without a sudden increase. If it is politically difficult to introduce a sudden increase in tariffs, when the public budget cannot be a substitute, the result is a dramatic slowdown in investment.

The crucial questions, from this latter angle, regard the capacity of water undertakings to (i) generate and (ii) have control over sufficient cash flows in relation to the cash expenditure that is required for replacing ageing systems and improving them with new additional investment. Total revenues, their relation to total costs and their stability are therefore the important issues at stake here. In principle, revenues could be obtained from many different sources (including taxation) and tariff structures (e.g. volumetric or flat); what really matters is the security of revenues and the "property rights" over cash flows, namely their destination to WSS.

2.2 Financial sustainability as a prerequisite of environmental sustainability

Since the water capital is either natural or man-made, in order to achieve intergenerational fairness the current generation should be able to guarantee that both the natural capital and infrastructural assets are reproduced for the next generation; this would not be the case if the value invested in WSS deteriorates over time. Furthermore, physical infrastructure is not the only important aspect. Delivering water services in a way that is compatible with ecological equilibrium also requires increasingly sophisticated technology, specialized equipment and professional skills. The economics of WSS therefore also requires that appropriate resources are allocated in order for the sector to be attractive for high-quality inputs, stimulate research and development, and through it innovation, vocational training, etc.

Rather than being merely an autonomous and self-standing dimension of sustainability, thence, financial sustainability measures the ongoing capability of water management to invest adequate resources aimed at optimizing the impact of anthropic use on natural ecosystems, in order to preserve their value. The same final use – i.e. the supply of a certain quantity of water to a household and its restitution to the natural environment – affects ecosystems in rather different ways, depending on what water resources are used, how is water mobilized and treated, and so on. More generally, the water capital entails both a natural and an artificial component; the latter may provide an (imperfect) substitute of the former, at least for some environmental functions, provided that an adequate investment effort is put in place (Massarutto, 2012).

In this sense, water sustainability depends on how its management system is designed and on the ongoing capability of devoting adequate resource to the realization, maintenance and renovation of assets. Ultimately, water stress always depends on the fact that available resources (here and now) do not match with actual demand; yet with a sufficient economic effort, no water stress would actually take place, given that available resources on a worldwide basis largely exceed any imaginable use. The point is that this implies an economic cost which water users should be willing and able to bear; and this (theoretical) willingness and ability to pay should be translated into institutional mechanisms actually ensuring that needed resources are actually set aside and made available to the entities that manage the artificial water system (Massarutto, 2012).

2.3 Water pricing, cost recovery and financial sustainability

Many water pricing surveys so far have compared tariff levels and tariff structures (Oecd, 2009). This information is not immediately useful for assessing cost recovery, since it is known that WSS costs are very diverse. Assessing cost recovery through accounting documents could be a more significant indicator, yet again in a very imperfect way.

First, accounts on which cost recovery are assessed often miss the truly critical element,

namely capital expenditure. The capital costs that are accounted for and recovered through tariffs depend on how much of the investment is actually sourced by the operator. Accounting for the asset base of water utilities is not straightforward, for at least three reasons.

In the first place, since WSS assets have typically a very long economic life, inflation has to be considered. Accounting only for the historical cost can seriously underestimate the real depreciation of assets, and prevent an effective

In the second place, WSS infrastructure has always been provided with a substantial – even not unique – funding by the public budget under various subsidy and grant schemes. Since capital provided in this way has been already raised from taxpayers, it might seem undue to consider it as a cost to be recovered; however, unless it is accounted for, at the end of the economic life of the asset the operator will lack financial resources for its reconstruction: a new grant-in-aid would be needed.

In the third place, remuneration of capital – namely, the cost of financial provision - has to be accounted for. Obviously, when water operators borrow from the financial market, they have to pay an interest (or a dividend in case of equity finance). Since the opportunity cost of capital depends on risk profiles, and since risk of operation ultimately depends on how the industry is regulated, this typically implies a circular relation: the more risks regulation allocates on WSS operators, the higher the cost of capital (Pedell)

For this reason, many claim that public funding should be preferred, since the state does not need to obtain a profit. By the way, such a political stake inspired the Italian 2011 referendum on water privatization, which stated that remuneration of capital should be abolished (Massarutto; Scarpa). However, this argument fails to consider that an opportunity cost does actually occur also when investments are financed directly through cash flows originated from current revenues, or are covered by public grants. The economic cost corresponds in this case to the “marginal cost of public funds”, namely the interest paid by the state on long-term government bonds plus the cost determined by the tax wedge on society as a whole (cit). Failing to attribute this cost to the WSS means that it is merely socialized. In other terms, the state could use the scarce resource (the public budget) for something else (eg another public service, welfare, or even tax reductions), and this is a real “opportunity cost”.

A rapid survey of accounting practices in OECD countries shows that capital is provided in many different ways, which are reflected in the way the regulatory asset base (RAB) is calculated.

In some cases (e.g. England and Wales; Italy) the RAB corresponds to the additional investment made by the operator during the contract, while the value of assets realised in the past is set at a conventional value that may correspond to the price paid by subscribers at privatisation, as in England and Wales; but also to zero, as in Italy, where assets are owned by municipalities and used by operators on a free-loan basis.

In France, the RAB corresponds to the lease fee paid by the operator and passed through on tariffs; the fee normally corresponds to the cash expenditure for reimbursing loans. Where public management prevails, capital cost is based on historical cost (NL, USA) or reconstruction cost (Germany), but in most cases it is not even accounted for.

The second reason is that tariffs paid by final customers are not the only way to guarantee cost recovery. In fact, what counts in the end is that costs are recovered in some way and that financial means are readily available when needed, regardless of the mechanism actually sourcing them; whether what people actually pay belongs to this or that category (tariff vs. taxation) often depends on national conventions. In addition, the way the burden

is shared by consumers is also unimportant.

What is important, however, is to assess how far the alternative sources of revenue (tariffs, taxes, transfers) are reliable, timely and flexible in order to meet present and future financial obligations. What counts for this purpose are the property rights on cash flows and their destination, not their economic nature (i.e. their belonging to the category of tariff, tax or transfer). Revenues from tariffs, once defined by regulators, are those on which the operator has the highest degree of control, even if the predictability of their total amount depends on regulatory clauses (e.g. revenue caps, guarantee of minimum revenues, enforcement against delinquent payments and so on); this is particularly important in case of discontinuity in the management regime (e.g. change from public management to delegation; change in the tariff structure), when the response of customers is not straightforward, whereas in established systems quantity demanded and level of delinquent payment can be more easily predicted. Government subsidies, in turn, may be considered as the flows over which the operator has the lowest degree of control and predictability. There are many alternative and intermediate sources whose availability can be at least partially predictable and controllable: for example, funds that are set aside in water-dedicated funds (although administered by different authorities) can be considered as more reliable than subsidies from the general budget; funds from local taxation, again, may be seen as at least partially more reliable than national ones.

2.4 An indicator of financial sustainability based on free cash flows

In order to overcome the difficulties outlined above and come up with a more meaningful and useful comparison, we have developed an original methodology for assessing financial sustainability.

Debt service is ultimately guaranteed by free cash flows, which result from the sum of Ebitda (Revenues less Operational costs), variation of working capital and net investments in new assets. In a stable industry, we can assume that the asset base is constant; Ebitda should be high enough to cover expenditure for interest and to finance replacement of depreciated assets. However, when this is not the case (due to systematic past underinvestment or because of a structural need to upgrade the system), investments may need to be higher than depreciation of existing assets.

Our methodology takes this aspect into account. It is based on the calculation of a ratio between operational margins and the financial needs that arise from the actual investment need. This ratio has different interpretations in the short, medium and long terms, as follows:

- Short-run financial sustainability (SRF): is based on the ratio between the actual FCF and existing financial obligations (actual and prospective given the actual level of debt) (SRF1). This indicator captures the capacity of the actual arrangement for managing WSS to generate adequate cash flows in face of already existing and planned capital expenditure. A value > 1 indicates that the operation is generating more cash than actually needed at present; this can be set aside for future investment, or be extracted by company owners. A complementary indicator is represented by the ratio between FCF and total revenues (SRF2), offering a measure of the level of investment that the current management is able to sustain in relation to the dimension of the system.

- Medium-run financial sustainability (MRF) applies the same scheme considering perspective cash flows (allowed by already approved tariff plans and/or implicit in the price regulation mechanisms already in place) and the planned investment effort along the time lag of the concession contract

- Long-run financial sustainability (LRF): is based on the ratio between perspective FCF, calculated as for MRF, and a conventional value corresponding to the reconstruction cost

of existing assets. In practice, this indicator compares the existing structure with the one that should be put in place in order to compensate the true depreciation of existing assets. If this value is lower than 1, it means that at present the system is able to set aside only a fraction of what is theoretically needed; in other words, replacing the existing asset base will be feasible in the future only with a price increase equal to 1/LRF.

3. The evolution of water price regulation regimes in Italy

3.1 From public finance to FCR

Although a legal provision for setting prices allowing the recovery of costs has ever existed, this principle was in practice disregarded until the late 80s. When a national overview over prices of many essential items (including water) was introduced in 1941, utilities were generally in financial equilibrium, even if controlled by municipalities. Since 1941, price regulation was mostly designed with the aim of keeping prices low; nominal price increase allowed was unable to keep the pace of inflation, and very early the sector started to depend on the public budget. Ordinary municipal budgets were complemented by long-term soft loans provided by the national public sector lending facility, Cassa Depositi e Prestiti, while new infrastructure was more often funded by national and regional budgets and channeled through water plans.

Since most of the money was sourced or guaranteed by the State, operation could remain local, unless when a larger operational scale was justified by technical reasons (e.g. interconnected schemes). This was more the exception than a rule, also considering the bumpy structure of the Italian territory (mostly mountainous, scattered settlements etc). As a result, the WSS management system was fragmented in a countless number of independent undertakings, whose number could only be roughly estimated (in the reach of 13.000 units). Most of them were run directly by municipalities with direct labour; bigger utilities, especially those servicing large cities and integrated areas, were nonetheless often adopting a more structured management form (publicly-owned companies, often organized as multiutilities). The latter were sometimes able to finance some investments using cross-subsidies from other services.

Prices started to increase in correspondence with budgetary crises that led Italy close to bankrupt; however still at the end of the 90s revenues from tariffs hardly allowed the recovery of operational costs, with only a handful of utilities able to finance at least a fraction of investments – these were typically multiutilities using cash flows generated by other services such as electricity and gas distribution.

The crisis of public finance, culminated in 1992, caused a continuous decline of investments. After 1985, capital expenditure dropped from the already low average level to 17 €/inhab/yr, with bottom peaks below 10 €/yr in many Regions (table 1).Ongoing underinvestment was leading to a rapid deterioration of the infrastructure, witnessed by indicators such as the high and increasing volume of leakages (27% on average); at the same time, heavy investment requirements were being imposed by the need to comply with EU directives in the field of drinking water quality and sanitation. Particularly Dir. 91/271 (Urban Wastewater Directive) provided a significant challenge with this respect.

Since the recourse to the public budget had become manifestly impossible, the only alternative could be provided by the market.

Law 36/1994 aimed at an far-reaching reform, on the following pillars (Danesi et al,2005; Mysiak et al., 2013)

- Financial self-sufficiency of WSS undertakings via full-cost recovery and market-based financing, in order to ensure a stable reprise of investments;

- Creation of larger management units (“ambiti territoriali ottimali”, ATO), able to exploit economies of scale and reaching a critical mass for accessing financial markets; for this

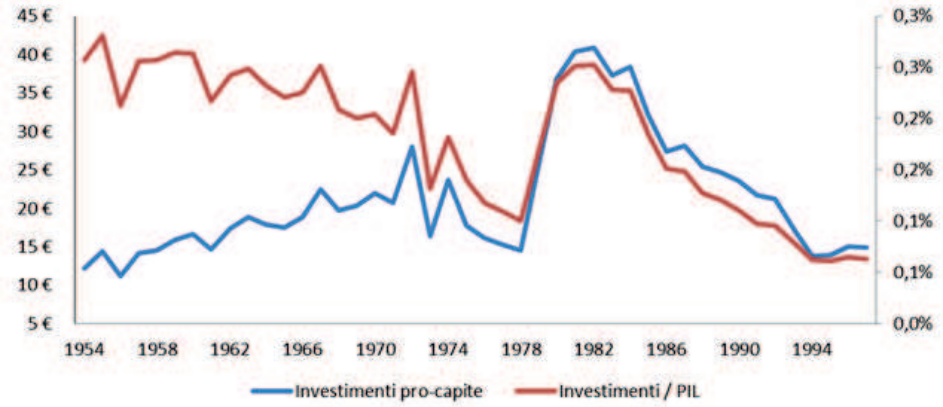

Figure 1: Investment in water and sanitation assets in Italy (all values in € 2009). Source: our elaboration on Istat

purposes, regions were expected to design ATOs and oblige municipalities within each ATO to establish a collective entity aimed at taking over municipal responsibilities and supervision (ATO Authority, or AATO);

- Delegation of operation to independent management entities following a concession scheme (operators are responsible to enact the prescribed investment plan and provide financial resources at their own risk, with the only guarantee of financial cash flows arising from tariff revenues);

- Within each ATO, a single management system was theoretically imposed (one management plan issued by the AATO, one operator, one delegation contract, one tariff), yet many exceptions were legally possible, allowing to "safeguard" existing undertakings provided that their efficiency could be demonstrated.

3.2 The "Normalized Method (MTN)" (1996-2011)

Law 36/1994 affirms the principle of full cost recovery, which is intended to provide operators with the means to sustain all financial commitments. Costs are intended as the sum of operational cost and depreciation, also including an "adequate remuneration" of capital; no provision was made at the time for environmental and resource costs.

The more detailed implementation of this principle was committed to the issue of a "standardized method" (Metodo tariffario normalizzato, MTN), which was supposed to provide a framework that competent authorities would implement in each local undertaking: local authorities would thence have to approve a plan aimed at identifying desired service levels, investments to be made and maximum tariffs allowed during the contract period. This plan would be later incorporated in the contract with the WSS operator, either in case delegation was made to own companies (in-house) or private and mixed public-private companies.

The MTN was adopted two years later (DM 1/8/1996). Its structure was rather simple. A first step concerned the calculation of allowed costs. These included both operational and capital costs. Operational cost was set at the start at the level reached by previously existing undertakings, ev. taking into account the effects of mergers and organizational rationalization. The plan would then consider its future dynamics on the basis of forecasted service extensions and efficiency improvements.

A price-cap mechanism required operational cost to diminish by at least 0,5% per year or more, according to the deviation from a standard cost calculated through a benchmarking econometric formula; in case actual costs exceeded the formula for more than 20%, higher price-caps were imposed and a stricter authorization procedure was

foreseen. Some cost items were nonetheless considered as exogenous and passed-through automatically (electricity, bulk water purchase, local taxes).

Already existing assets belonging to municipalities were supposed to be made available on a free-loan basis (therefore with no charge). Already existing financial obligations (eg pending loans) would be taken over by the operator (and passed on as operational costs) or reimbursed to municipalities. Concession fees were often introduced in exchange of the contribution of physical assets as WSS companies' equity, and passed-through as well.

The regulatory asset base (RAB) was formed by all investments made by the operator at the historical value, net of grants and subsidies eventually received. This was intended on an ex-ante basis, i.e. allowed tariffs were calculated on the basis of planned investments, save an eventual negative ex-post compensation in case actual investment was below schedule.

The RAB also included all assets owned by WSS companies from the beginning (e.g. because they had been realized previously with own funds or contributed as equity by parent municipalities). This provision created an uneven starting situation: companies beginning their operation newly after the reform had in practice a zero asset base from the start.

Allowable capital cost included depreciation and remuneration of capital, with the following rules:

- Depreciation was calculated according to accounting principles adopted by operators, within the limit of the rates allowed by tax law.

- As far as capital remuneration is concerned, a lump-sum pre-tax 7% was applied to the net RAB; the MTN prescribed that this rate should be regularly updated according to market conditions.

Once the allowed cost was so defined, tariff would be calculated in such a way to allow its full recovery, yet a smoothening mechanism was introduced in order to limit annual price increases. Unbalances arising in such way would be transferred as costs to be recovered in the next periods.

The MTN required a regular update on the basis of three-year regulatory periods (or even in-between, in case substantial unbalances arose). Reviews should assess the regular implementation of investment plans (and reduce tariffs accordingly in case of incomplete realization) and adjust allowed operational costs.

Apparently, this scheme seems appropriately designed for the aim of guaranteeing financial equilibrium. In practice, this is not necessarily the case: since substantial margins of discretional power were left to the implementation phase, regulators may actually force the interpretation of framework principles according to other priorities, and this is more likely to be the case when regulators are conditioned by political entities.

Massarutto and Ermano (2012) offer a thorough analysis of how discretional power of regulators could actually pledge tariff setting to other priorities.

First of all, the MTN allows to adopt whatever depreciation schedule is allowed by fiscal norms. In practice, this means that the chosen schedule may vary between the extreme of true economic life (which is actually very long for WSS assets) and the opposite extreme of financial amortization (that is, following the duration of concession contracts).

In the former case, the actual impact on prices is low, but cash flows will be hardly high enough to cover financial expenses (given that bank loans will likely require shorter and tighter repayment schedules). Financial amortization, in turn, is more coherent with the

requirement to repay loans (since the operator will be able to extinguish financial obligation before contract expiration); in turn, the impact on tariffs may be dramatic and difficult to sustain in political terms.

Just to make an example, in Tuscany and Emilia-Romagna – two Regions where investment plans were actually more challenging and a coherent price regulation was adopted – prices reached rather soon the threshold of 2 €/m3, more than double than prior to the reform.

Second, the allowed rate of return had been set provisionally at nominal 7% pre-tax; the MTN prescribed this rate to be periodically updated following market conditions, but this never took place. In the first phase it came out to be much lower than the market rate; after Italy joined the Euro, however, the opposite became true; investing in WSS assets would thence allow a "secure" return higher than borrowing rate. The boost of the global financial crisis in 2008 opened a new phase, with far higher rates than the allowed one.

Third, operational cost revision soon proved to be a troublesome task. National benchmarking formulas were too imprecise and generic, unfit to the task of actually revealing efficiency levels. ATO plans were based on desktop calculations, often provided by external consultants using rules-of-thumb and replicating basic templates. Since the starting level was admittedly unreliable, the adoption of more realistic figures was devolved to the revision phase. Rather than a routine exercise, therefore, this became a crucial and delicate decision, for which the regulatory system was unprepared, in the lack of appropriate tools and procedures.

AATOs were in fact sovereign about the decision to review them (aligning to actual accounts) or force the implementation of initial calculations. In practice, the outcome could range from sticking to the initial calculation and refusing to review operational cost upwards to docilely adopting operators' accounts "out-of-pocket"; political opportunity, rather technical assessment, very often inspired the actual decision. The national supervisory committee, Conviri – a very weak office, understaffed and lacking decisional autonomy – could only verify formal aspects, but not enter into the merits of figures.

Although price reviews were foreseen every 3 years, many AATOs failed to do so because of the difficulty to reach the formal agreement of a large number of associated municipalities. As a result, reviews required a longer time, and substantial gaps between allowed and actual costs continued to occur.

According to the MTN, the final regulatory outcome that is defined in each review was a fixed average charge per cubic meter (the so called "tariffa reale media", obtained dividing the total cost per the forecasted volumes): in case the latter were overestimated, a lower unit charge resulted, and this was frequently done on purpose, in order to artificially soften the effective increase. An assessment of actual volumes was supposed to be made by price reviews: delaying the latter would thence allow to postpone tariff increases.

Finally, the MTN was supposed to enter into operation once the reorganization of the WSS management system had been completed. Since the prescribed time schedule of 12 months soon revealed to be unrealistic (it took in fact many years to see the first completed reorganizations, and more than one decade until the majority of ATOs, an interim price regulation method was approved in 1999; this was based on a simple price-cap rule to be defined each year. This incorporated an automatic incentive to efficiency (with a classic RPI – X scheme) which was complemented in some years by some allowances aimed at sustaining urgent investment needs. Yet in most of the years the national authority in charge for setting price limits decided to maintain a zero nominal price increase – this was technically argued through the definition of an X factor equal to the

inflation rate: but it was clear enough that political willingness not to disturb electors with price increases was predominant.

3.3 The AEEG method (MTT and MTI)

The MTN remained untouched until 2011, despite an increasing evidence of its inadequacies. Paradoxically, its actual implementation managed to discontent everybody: too low prices (and too unpredictable dynamics) to sustain investments, but high enough to attract public concern and mobilize social protest. This culminated in the summoning of the 2011 referendum, triggered by supposed threats of privatization and successfully addressed to abolishing the norm requiring WSS to include an "adequate remuneration of capital", which most voters understood as a guaranteed private profit over an essential service (Massarutto, 2011; Scarpa, 2013).

After the referendum, competences about water tariff regulation were transferred from the previous ministerial committee, Conviri, to an independent authority, AEEG (already competent for electricity and gas supply).

Following a consultation phase, AEEG issued in December 2012 its regulatory norms valid for 2012-2013 (transitional period). The "transitional pricing method" (MTT) is in fact far less "transitional" than its label suggests, since it moves from the attempt to set up a general scheme able to fit most local situations, anticipating as much as possible the philosophy of the definitive rule.

The scheme is based (as for the MTN) on the identification of an allowed total revenue, corresponding to the sum of costs. The regulatory outcome, however, is expressed in terms of allowed total revenue, and not on unit charge. Update of unit tariffs is done automatically and will not require a formal price review – thence eradicating the bad habit of inflating planned volumes on purpose.

Another important innovation consists in procedural aspects. While AATOs maintain (and even improve) their discretional powers, operators can bypass them in case of inaction or disagreement, and appeal autonomously to the national regulator. This provision is expected to give AATOs the possibility to effectively tailor solutions to the local situation, but at the same time to prevent the abuse of political discretion.

As far as operational cost is considered, they are divided in two categories (endogenous and exogenous), the former being considered as potentially influenced by operator's effort.

Endogenous costs are based on actual costs, as they appear in operators' 2011 accounts. This will represent the new starting basis; afterwards, a systematic comparison between actual costs and benchmarking parameters will be adopted; pending the calculation of new and more reliable standard costs, existing plans will serve as a reference.

For the first regulatory period the AEEG gave up thence the attempt to use parametric formulas and decided to rely on previously forecasted costs as a basis of comparison. Allowed opex will converge to the average between actual and forecasted cost. Whilst this is reasonable, in the lack of more appropriate benchmarking instruments, it perpetuates nonetheless the gaps eventually caused in the past by different attitudes of AATOs, since the planned cost has not necessarily been calculated in an appropriate way, and gaps between actual and forecasted cost do not necessarily reflect operator's inefficiencies.

In the future, price reviews are expected to take place every 4 years; at the beginning of each regulatory period, actual operational cost of the previous period will be confronted with a benchmark, and efficiency-improving price caps will be introduced accordingly. A very detailed unbundled accounting system is being introduced, with the aim of allowing more effective comparisons between the cost of different phases and establish more

meaningful and reliable benchmarking formulas.

Exogenous costs (which include electricity, wholesale services local taxes and contributions) are passed-through, yet a cap is placed on some items basing on national average market prices, such as for example in the case of electricity.

This provision substantially maintains the previous approach, but provides a more predictable and automatic framework for regular updates, reducing the discretional power of AATOs.

The approach to capital cost regulation, instead, reversed completely the previous one. The RAB is now based on existing physical assets on an ex-post basis, whatever their ownership and whatever the source of funding.

For this purpose, existing assets are stratified according to the year of realization and values are systematically updated with inflation so as to correspond to their net reconstruction value; on the other hand, depreciation schedules are now calculated on the basis of true expected economic life. New investments enter the RAB with a two-years time lag (i.e. an investment realized in year t will be considered in the regulatory cost starting from year t+2).

	MTN	MTT
Asset base	Assets already owned by operators at book value New investment made by operator at historical cost	Assets already owned at reconstruction cost New investment at reconstruction cost Assets owned by municipalities at reconstruction cost
Grants received	Not included	Included (depreciation only)
Depreciation	Following tax legislation	True economic life

Table 1: Comparison of capital cost accounting criteria in MTN and MTT. Source: our elaboration

Therefore, depreciation costs are considered for all assets, including those that have not been financed by the operator; however, cash flows arising from public funds or from assets owned by municipalities will be set aside in a fund that can be used for new investments or social purposes (the so-called "fund for new investments", FoNI).

The regulatory rate of return is based on a calculation that follows the capital asset pricing model (CAPM), namely considering the risk-free rate plus a risk premium which is calculated on the basis of market data. An extra bonus of 1% is foreseen as a lump-sum compensation for the time-lag of two years.

The AEEG considered the opportunity of introducing preferential rules for more urgent investments, according to national priorities. For example, in the imminence of EU sanctions due to the already concluded infringement procedure for incompliance with the Urban Wastewater Directive (Dir. 91/271), investments aimed at accelerating compliance may be allowed shorter depreciation or higher remuneration. However, the introduction of such incentives is postponed until their compatibility with the outcomes of 2011 referendum (which abolished the "adequate remuneration of capital") will be confirmed.

4. Comparison of methods

In 2011, still the implementation of the reform was incomplete; yet most ATO plans had been approved. They initially foresaw a higher level (37 €/inhab/yr on average over the planning horizon, with a concentration in the first period). However, many plans had to be substantially reviewed, since operational costs revealed to be higher and volumes lower. In order to avoid higher tariff increases, investment plans have been slowed down and spread towards the end of delegation contracts. The planned investment effort that results from reviews corresponds to 30 €/year per capita on a national basis. Massarutto

1954-1969	1970-1978	1980-1989	1990-1997	ATO plans		First regulatory period	
				original	post revision(*)	planned	actual
16,2	18,0	32,4	17,3	37,3	30,6	61	33

Table 2: Comparison of pre- and post-reform investments at constant prices (€/inhab/yr). Source: Our elaboration on Istat and Anea-Utilitatis; all values in €2009

et al. (2013) argue that this is far below the real needs. Table xy illustrates the point, considering a sample of 9 ATOs, corresponding to approx. 10 million inhabitants. Required investments have been calculated with the aid of a parametric formula and then normalized on an yearly basis considering the actual expected economic life (details are illustrated in Massarutto, 2013).

	1	2	3	4	5	6	7	8	9	average
Actual + planned	67.4	11.9	30.0	31.6	37.8	61.1	20.5	53.3	36.0	38.8
Needed	150.5	54.4	56.0	51.9	86.4	105.2	108.7	52.8	58.1	80.4
Absolute gap	83.1	42.5	26.0	20.3	48.6	44.1	88.2	-0.5	22.1	41.6
Ratio	2.23	4.57	1.87	1.64	2.29	1.72	5.30	0.99	1.61	2.07

Table 3: Comparison between planned and needed investment (€/inhab/year, actualized at 2009 €). Massarutto et al., 2013

Except of one case, all plans lag far behind requirements (on average needed investments are twice as high, but in some areas the gap is much higher (up to 5 times, as in case n. 7).

Nonetheless, the AEEG in the first two years decided to keep existing investment plans as fixed, requiring ATOs to provide a calculation of the projected tariff increases following the implementation of the MTT, with the purpose of verifying its impact on financial sustainability of existing plans.

In the following of this chapter, we'll present some preliminary evidence that arises from a direct inquiry made on selected case studies. We first discuss the impact of the MTT on capital cost (par. 4.1), while in par. 4.2 we shall use the indicators discussed in par. 3

4.1 The effects on CAPEX

From a survey we have conducted over a sample of 15 undertakings, we estimate that the new accounting method leads to an increase of the capital cost recognized in 2012 by an average 28%, with peaks of more than 100% for some ATOs (table).

The average 28% increase of capex in the first year masks in fact an uneven situation. The highest increases are shown in cases of ATOs where the existing asset base is rather high and investments already made are low; in turn, the few that were already investing and/or had a low initial asset base could even decrease their allowed tariff.

It is also interesting to note that the composition of the cost varies, according to the share of assets owned by the operator and by municipalities.

The AEEG restricted in many ways the possibility to insert assets in the calculation. For example, it required that historical expenditure was registered, as a prerequisite for its revaluation with the standard inflation rates. Assets whose accounting value originated from expert appraisal or any other source different from the historical expenditure were not recognized. This caused a first problem to many water companies, that may have been created in the past, whose initial assets originated from indirect assessments, especially when they originated from systems previously run as direct labour. Only those having a long enough tradition of operation were able to provide the input data that fit the formal requirement. A similar difficulty concerned assets owned by municipalities, which in many cases could not be considered being impossible to trace back the records from original expenditure accounts.

	MTN	MTT	Δ%
1	12.948.352	24.207.599	87%
2	10.860.030	18.107.743	67%
3	20.586.000	46.301.324	125%
4	19.600.000	55.084.596	181%
5	2.645.879	4.886.661	85%
6	12.077.956	14.700.320	22%
7	285.349	379.171	33%
8	10.100.681	8.207.085	-19%
9	2.507.945	2.330.267	-7%
10	152.352	5.998.497	3837%
11	8.041.662	9.381.315	17%
12	21.784.874	20.197.822	-7%
13	165.494.951	176.296.218	7%
14	75.939.257	78.989.900	4%
15	9.281.837	12.566.840	35%
Total	372.307.126	477.635.359	28%

Table 4: The allowed Capex 2012 in a sample of WSS companies. Source: our elaboration on sample data.

4.2 Financial sustainability indicators: a preliminary assessment

Table 5 illustrates the result of the calculations based on the data we have been able to obtain from direct sources. Since the database is still being implemented, results concerning the MTT are only partial (and referred in fact to three case studies only). However, some interesting insights can be derived anyway.

Considering MTN, it is clear from the first glance that the short term equilibrium was substantially achieved in most cases. However, this indicator only demonstrates the ability to cover existing financial obligations – which are generally rather small. The capacity to sustain the approved investment plan out of the allowed planned tariff dynamics was much more questionable, also considering that our indicators are calculated on the basis of approved plans, most of which were still waiting for the first periodical review (thence, the actual operational margins could be much lower than forecasted).

Case 2 and 4 are the only companies that, at the time of the survey, had been able to obtain a structured long-term loan for the duration of the contract. It is also interesting to note that case 8, whose situation looked clearly unbalanced, managed the following year to obtain as well a structured loan, but had to revise significantly its investment plans, which were nearly halved with respect to initial forecast, for the same tariff increase.

Concerning long-run sustainability, all plans seemed quite far from the equilibrium. The existing and perspective cash flows could sustain only a fraction of the required investment.

The impact of MTT is clearly positive, at least in the three cases we have been able to analyze so far. The new accounting method for RAB allows an initial boost of tariffs, which could seem to allow an excess financial flow; this allows however to reduce future increases, due to the fact that the self-financing capacity is enhanced. As a result, the MRF substantially improves, with tariff increases that are generally in line (or lower) than previous ones.

Moreover, while the MTN often implied that financial equilibrium could be reached only after many years (provided that planning forecasts were fulfilled), the new tariff schedule allows to accelerate its achievement. This is obviously a further factor that is expected to improve bankability, since risks are reduced.

The LRF is also significantly improved, at least in two cases (while in case 5 the situation

	SRF		MRF		LRF	
	MTN	MTI	MTN	MTI	MTN	MTI
1	1,87		1,50		0,23	
2	1,30		0,96		0,27	
3	2,20		0,94		0,31	
4	1,01		1,01		0,16	
5	- 0,69	- 0,10	1,01	5,69	0,22	0,19
6			1,03		0,30	
7	1,69		1,65		0,29	
8	0,82	3,71	0,54	2,41	0,07	0,71
9	7,78		1,12		0,88	
10	0,93	0,99	0,90	1,81	0,19	0,74
Lombardia					0,32	
Emilia-Romagna					0,45	
Average (non weighted)	1,88		1,07		0,31	

Table 5: Financial sustainability indicators in a number of case studies. Source: our elaboration on data obtained from direct interviews

remains critical as before, substantially because tariff increases are needed, in the first place, to re-equilibrate previous financial distress. In the two other cases, in turn, LRF nearly quadruplicates. Both cases illustrate the most fortunate case (that in which the existing asset base is large enough to allow initial tariffs to generate a stable cash-flow from the beginning, and can therefore self-finance a significant part of investments).

5. The way ahead

The scheme on which the MTT is based was borrowed from the similar ones that AEEG already developed for electricity and gas. However, soon it revealed to be unfit for a sector that is facing an enormous infrastructural gap and requires huge investments and faces a dynamic phase of structural change.

The FoNI mechanism had been explicitly thought with the aim of providing an extra source of cash flow to sustain investments: however the existence of assets does not necessarily match actual investment requirements. The scheme could thence generate either an excess of financial endowments or the opposite (depending on the specific ratio between new investments and existing assets in each area).

Recognizing this failure after the first interim phase (2012-2013) the AEEG introduced two fundamental innovations in this scheme. In the first place, upwards revisions of operational costs can be admitted in principle (after an in-depth scrutiny) if motivated by structural improvements of the asset base. Second, the mechanism for capital cost is complemented by the possibility to generate an extra cash-flow in the initial phase, in case the volume of new investment is too high with respect to the existing asset base. The extra cash flow originates for example from the possibility to opt for a financial amortization of new investments (i.e. to shorten substantially the depreciation schedule in order to repay debts in due time). An anticipation for new investments is also foreseen: this has to be spent in three years' time.

The AEEG is also planning to introduce a mechanism that takes into account the very uneven situation concerning the recovery of unpaid bills (whose record is particularly high in the south of the country and undermines financial equilibrium, generating a high and rather unpredictable risk. Allowing unpaid bills to be treated (at least partially) as costs is clearly unfair to the other customers who regularly pay; yet the benefit for them could be a

reduction of the cost of capital due to the reduction of risk. The mechanism will include only a standard level of unpaid bills, and only provided that the operator has adopted a standard effort for recovering them.

Another opportunity will be offered by the consideration of resource and environmental costs. These are at the moment only considered as a discussion item, and provisionally set to zero. Introducing a specific cost component could be effectively designed in order to prioritize investments and promote cost-efficient solutions.

For example, in order to reduce leakage and promote network renovation (as we already said, this is an important priority, given the enormous amount. An abstraction charge could be imposed on gross abstractions, and passed through only on the basis of a targeted standard level of leakage, encouraging operators to accelerate the search for remedies. A similar scheme could be adopted for accelerating investments aimed to complying with UWWD and WFD: the cost of EU fines and the amount of environmental costs could be charged on operators and passed through only in a limited way, as a function of the desired speed of investment.

Thence, the "carrot" represented by the remuneration of investments at the market cost of finance + premium could be complemented by the "stick" represented by the ERC.

Similarly, performance-based prizes and sanctions are likely to be introduced.

These innovations allow to better tailor the regulatory scheme to local necessities (while the interim one was rigid and adapt only to cases where the asset base needed only marginal improvements). However, further evidence is needed in order to assess the real capacity of the system to guarantee a stable reprise of investments at a reasonable path.

The experience made with the MTN shows that the devil hides in the details: while seemingly designed in a way that should guarantee cost recovery (actual and perspective), the MTN was wrecked by an inconsistent political will to use it in an appropriate way. Where the MTN was properly and coherently used, despite rather high tariff increases, investment plans were actually implemented; in turn, it proved to be vulnerable to ex-post betrayal of its philosophy.

The MTI is now awaited to the proof of being able to resist such temptations. This will probably be more a matter of governance than of technical accounting algorithms.

References

Milne J., Andersen M.S., 2013, Handbook of Research on Environmental Taxation, Elgar, London

Danesi, L., Passarelli, M. & Peruzzi, P., 2007, Water services reform in Italy: its impacts on regulation, investments and affordability. Water Policy, 9 (1), 2007

Carrozza C., 2011, Italian water services reform from 1994 to 2008: decisional rounds and local modes of governance. Water Policy, 13 (6), 751-768.

Massarutto A., 2007, Water pricing and full-cost recovery of water services: economic incentive or instrument of public finance?, Water Policy, 9, 591-613

Massarutto A., Ermano P., 2013, Drowned in an inch of water. How poor regulation weakened the Italian water reform, Utilities Policy, 24, 20-31

Massarutto A., Antonioli B., Ermano P., 2013, Assessing the impact of water service regulatory reforms in Italy: a multidimensional approach, Water Policy, 15, 1046–1063

Massarutto A., 2011, I conti senza l'oste. Come pagheremo il servizio idrico dopo il referendum?, Economia dei servizi, 2/2011

Massarutto A., 2012, Urban water conflicts, and ecological-economic approach, in Barraqué B. (ed.), Urban Water Conflicts, Routledge, London

Massarutto A., 2013, Quanti investimenti servono davvero al sistema idrico italiano?, L'Acqua

Spulber D., 1989, Regulation and Markets, The MIT Press, Cambridge Ma.

Strosser P., Delacamara G., Gomez C., Lago M., Maziotis A., 2013, Changing current practice in

the application of EPIs to achieve the objectives of the WFD, EPI-Water Discussion Paper 01/13

Mysiak J., Farinosi F., Carrera L., Testella F., Massarutto A., 2011., Water tariff system in Italy and tariff structure in the Region Emilia Romagna (RER), Report of the EPI-Water project, Retrieved from www.epi-water.eu

Gómez C., Delacámara G., Pérez C., Ibáñez E., Rodríguez M., 2013, Droughts and water scarcity – Tagus (Central Spain & Portugal) and Segura (SE Spain) interconnected river basins, Report of the EPI-Water project, Retrieved from www.epi-water.eu

Defrance P., Raveau A., Amen J.F., 2013, PES and nitrate tax scheme in the Bassee-Voulzie area, Report of the EPI-Water project, Retrieved from www.epi-water.eu